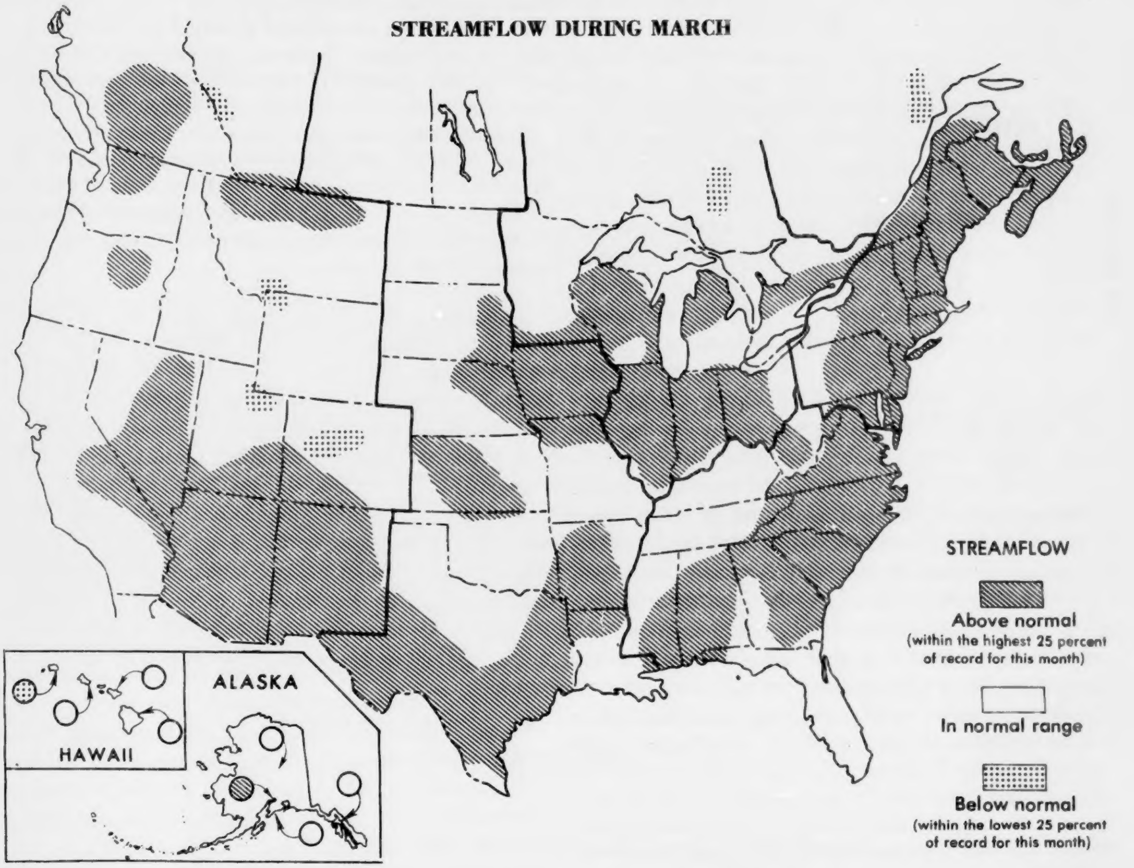
WATER RESOURCES REVIEW for MARCH 1979

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

CANADA
DEPARTMENT OF THE ENVIRONMENT
WATER RESOURCES BRANCH



STREAMFLOW AND GROUND-WATER CONDITIONS

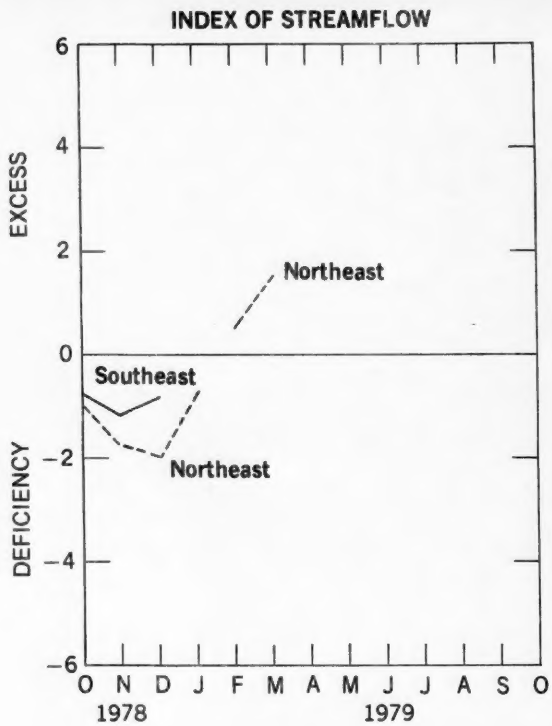
Streamflow generally increased seasonally in Idaho, Montana, Nevada, North and South Carolina, Saskatchewan, and throughout most of the Northeast, Midcontinent, and Western Great Lakes Regions. Monthly mean flows generally decreased in Alberta, Manitoba, Kentucky, Louisiana, Maryland, and Virginia, and were variable elsewhere.

Above-normal streamflow occurred in the Southwest, in a broad band along the east coast from Georgia to the Atlantic Provinces, and in a large area in and adjacent to Illinois in the Midwest. Below-normal streamflow persisted in parts of Utah and decreased into that range in small areas of southern Canada, Colorado, and Montana. Mean flows were highest of record for the month in parts of Connecticut, Iowa, Missouri, New Brunswick, Nova Scotia, Quebec, and Texas.

Flooding occurred in Alabama, Connecticut, Georgia, Illinois, Indiana, Iowa, Louisiana, Maine, Mississippi, Missouri, Montana, Nebraska, New Hampshire, New York, North Carolina, Pennsylvania, South Carolina, South Dakota, Vermont, and Wisconsin.

Ground-water levels rose in the Northeast Region, and were generally above average. In parts of Maine, some of the highest levels in more than 30 years of record were reached. In the Southeast Region, trends were regionally mixed, and were above average in Kentucky, Virginia, and North Carolina, and above and below average elsewhere in the region. In the Western Great Lakes and Midcontinent Regions, rising trends prevailed, and levels were mostly above average, but below average in Ohio. In the West, trends were mixed, and levels were below average in Washington, Idaho, and Montana, but above and below average elsewhere in the region.

New high ground-water levels for March occurred in Maine and Nevada, and a new alltime high level was reached in Maine and also in Kentucky. New lows for March occurred in Arizona, Arkansas, Georgia, Idaho, Kansas, Louisiana, Nevada, New Mexico, Tennessee, Texas, and Washington. A new alltime low was reached in the Texas Panhandle.



The index of streamflow is computed by multiplying the percent of a region that is deficient or excessive by the average duration of deficiency or excess. Thus, the index of streamflow excess for the Northeast during March increased to a value of +1.5 when most of the area in the Northeast Region was excessive for an average duration of 1.5 months.

NORTHEAST

[Atlantic Provinces and Quebec; Delaware, Maryland, New York, New Jersey, Pennsylvania, and the New England States]

Streamflow generally increased seasonally in most of the region but decreased in parts of Quebec, Maryland, New Jersey, and Pennsylvania. Monthly mean discharges remained in the above-normal range in parts of Quebec, Maine, Maryland, Massachusetts, New Jersey, and New York. Mean flows were highest of record for February in parts of the Atlantic Provinces, Quebec, and Connecticut. Flooding occurred in Connecticut, New Hampshire, New York, Maine, Pennsylvania, and Vermont.

Ground-water levels rose. Levels were above average in Maine, Delaware, and Maryland, and substantial parts of New Jersey and Pennsylvania. In several parts of Maine, levels were at or close to highest levels for end of March in more than 30 years. Levels continued a rising trend on Long Island, New York.

In northern New York, where mean flow of West Branch Oswegatchie River near Harrisville was in the normal range and only 77 percent of median in February, monthly mean discharge increased sharply to 216 percent of median and was above the normal range. (See graph on page 3.) Monthly mean flows at the remaining index stations in the State increased seasonally and ranged from 2 to nearly 3 times median and were also in the above-normal range. On Long Island, monthly mean flow of Massapequa Creek at Massapequa remained in the above-normal range for the 3d consecutive month. Moderate flooding occurred in some areas of the State, early in the month, as a result of ice jams and snowmelt runoff.

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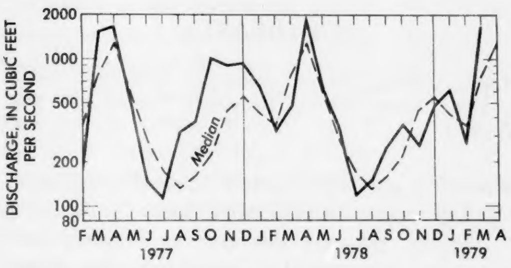


Monthly mean discharge of West Branch Oswegatchie River near Harrisville, N.Y. (Drainage area, 258 sq mi; 668 sq km)

In the Susquehanna River basin in Pennsylvania, snowmelt runoff caused lowland flooding with most main-stem gaging stations cresting during the period March 6–7. At the headwaters gaging station, Susquehanna River at Towanda (drainage area, 7,797 square miles), a peak stage of 24.04 feet, discharge 179,000 cfs, occurred March 6. That discharge was equivalent to a 25-year flood. Downstream at Harrisburg (drainage area 24,100 square miles), the peak discharge of 416,000 cfs on March 7 was slightly less than a 10-year flood event. Monthly mean flow of the Susquehanna River at Harrisburg increased sharply and was in the above-normal range. Elsewhere in the State, monthly mean flows at index stations generally increased, were greater than median, but within the normal range.

In Maryland and Delaware, monthly mean discharges at index stations decreased, in contrast to the normal seasonal pattern of increasing flow, and remained in the above-normal range for the 3d consecutive month.

In southern New Jersey, mean flow of Great Egg Harbor River at Folsom increased seasonally, remained in the above normal range for the 3d consecutive month, and was 192 percent of median. In the northern part of the State, monthly mean flow of South Branch Raritan River near High Bridge decreased from the above-normal flows of January and February and was within the normal range. Cumulative runoff for the first 6 months of the 1979 water year averaged about 1½ times median at all index stations and was above the normal range statewide.

In Connecticut, streamflow increased seasonally and was above the normal range throughout the State. At Burlington Brook near Burlington (drainage area, 4.13 square miles), the daily mean flow of 282 cfs on March 6 was highest for the month in record that began in September 1931. Cumulative runoff at all index stations in Connecticut for the first 6 months of the 1979 water year ranged from 1.3 to over 2 times the median cumulative runoff. Minor lowland flooding was reported along the Connecticut River at monthend.

In adjacent Massachusetts, mean flow of Ware River at Intake Works near Barre increased seasonally and remained in the above-normal range for the 3d consecutive month. Runoff at that site was second highest for March for period of record (exceeded only by that of March 1936).

A combination of heavy rain, warm temperatures, and snowmelt caused severe ice jams and resulted in flooding March 6–7 on major streams in northern sections of Vermont and New Hampshire. At Lamoille River at East Georgia, Vt., the peak stage of 21.64 feet (ice jam) on March 6 surpassed the previous maximum stage of 18.81 feet (ice jam) on April 3, 1959. At Connecticut River at North Stratford, N.H., the peak stage of 20.6 feet (ice jam) on March 7 exceeded by about 4 feet the previous maximum stage of 16.66 feet (ice jam), which occurred March 13, 1936. Monthly mean flows of index stations at Pemigewasset River at Plymouth, N.H., and White River at West Hartford, Vt., increased sharply to 4 and 2 times their respective median flows and were above the normal range.

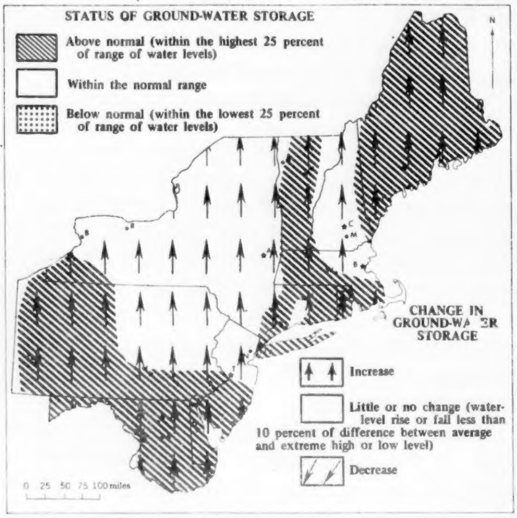
In Maine, heavy rains and warm temperatures produced substantial rises on most rivers about the 8th and again about the 26th of the month. These rises, coupled with some ice jams, caused lowland flooding in several areas of the State. In southern Maine, where monthly mean flow of Little Androscoggin River near South Paris was below the normal range in February, flow increased sharply to 345 percent of median during March and was above the normal range. In the central part of the State, mean flow of Piscataquis River near Dover-Foxcroft also increased sharply to 552 percent of median and was in the above-normal range. In northern Maine, mean flow of St. John River below Fish River, at Fort Kent increased seasonally to over 7 times median as a result of snowmelt runoff and remained in the above-normal range for the 2d consecutive month.

In Nova Scotia and New Brunswick, monthly mean flows were above the normal range as a result of runoff from early spring rains and were highest of record for March at several index stations. In southern New Brunswick, the monthly mean discharge of 1,090 cfs, and the daily mean of 6,580 cfs on the 26th at Lepreau River at Lepreau (drainage area, 92.1 square miles) were greatest for March in 63 years of record. Similarly, in northern New Brunswick, the monthly mean flow of 1,140 cfs was greatest for the month in 50 years of record at the index station, Upsalquitch River at Upsalquitch (drainage area, 877 square miles). In Nova Scotia, the monthly mean flows of 4,300 cfs and 1,670 cfs at the index stations, LaHave River at West Northfield and Northeast Margaree River at Margaree Valley, respectively, were highest for March in over 60 years of

record, exceeding the previous highs established in March 1936.

In eastern Quebec (south of the St. Lawrence River), monthly mean flow of Matane River near Matane (drainage area, 636 square miles), increased seasonally and remained in the above-normal range. The daily mean flow of 10,500 cfs on the 27th at that site was highest for March since records began in 1923. Also in eastern Quebec, but north of the St. Lawrence River, mean flow of Outardes River at Outardes Falls continued to decrease seasonally and remained in the below-normal range. In the extreme southern part of the Province, monthly mean flow of St. Francois River at Hemmings Falls increased sharply and was in the above-normal range.

Ground-water levels rose in response to recharge from rainfall and snowmelt accompanied by moderating temperatures. Near end of month, levels were above normal in most of New England and also in Maryland, Delaware, southern New Jersey and western Pennsylvania. (See map.) Levels in observation wells representative of water-table conditions on Long Island, New York, were in the above-normal range (upper quartile) for the first time in seventeen years, as part of a slow but steady rising trend. Wells in several parts of Maine were at or close to the highest levels for end of March in more than 30 years of record, in sharp contrast to the far-below normal levels in some of these wells last summer and fall.



Map shows ground-water storage near end of March and change in ground-water storage from end of February to end of March.

SOUTHEAST

[Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia]

Streamflow generally increased seasonally in Florida, Georgia, Mississippi, North Carolina, South Carolina, and West Virginia, generally decreased in Kentucky and Virginia, and was variable elsewhere in the region. Monthly mean discharges remained in the above-normal range in parts of Alabama, Florida, Georgia, Mississippi, North Carolina, Virginia, and West Virginia, and increased into that range in parts of South Carolina and Tennessee. Flooding occurred in parts of Alabama, Georgia, Mississippi, North Carolina, and South Carolina.

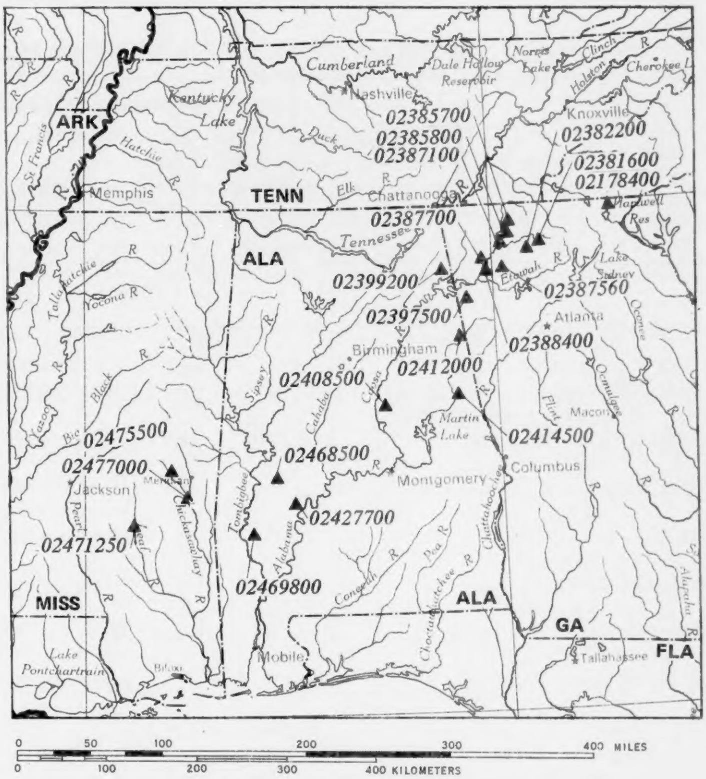
Ground-water levels rose in Kentucky and Mississippi, and declined in Alabama and in most of Florida; trends were mixed elsewhere in the region. Levels were above average in most of the northern States in the region and below average in much of Georgia and Florida. A new alltime high water level was reached in Kentucky, and new March lows occurred in Tennessee and Georgia.

In the Coastal Plain of North Carolina, the flooding that was in progress on the major streams at the end of February continued during the first week in March. Monthly mean flows increased during March and were above the normal range in all parts of the State. For example, mean flows of French Broad River at Asheville, in extreme western North Carolina, and of South Yadkin River near Mocksville, in the west-central Piedmont, increased seasonally and remained in the above-normal range for the 3d consecutive month. In the eastern Piedmont, mean discharge of Neuse River near Clayton increased, contrary to the normal seasonal pattern of decreasing flow, and also remained above the normal range for the 3d consecutive month.

In South Carolina, flooding occurred over most of the State early in March as a result of high carryover flows from February and increased runoff from intense rains. In the eastern part of the State, mean discharge of Pee Dee River at Peedee increased sharply, was 277 percent of median, and was above the normal range. The peak stage during the month was highest for March since 1945 and the peak discharge was slightly greater than that of a 25-year flood at Peedee. Runoff from intense rains near monthend resulted in bankfull stages on many streams throughout the State. Monthly mean flow of Lynches River at Effingham (drainage area, 1,030 square miles) also increased into the above-normal range as a result of high carryover flow from February and increased runoff early in March. The daily mean discharge of 11,000 cfs

on March 3 at that station was only 3 percent less than the maximum daily mean for March in 50 years of record.

In northern Georgia, rapid runoff from intense rainfall March 3 and 4 resulted in severe flooding in Bartow, Chattooga, Floyd, Gilmer, Gordon, Murray, Polk, and Whitfield Counties. Rainfall of more than 7 inches in 24 hours was reported to have fallen at Cedartown, near the Georgia – Alabama boundary, in Polk County. The peak discharge of 11,000 cfs on March 4 on Cedar Creek near Cedartown (drainage area, 109 square miles) was the greatest observed at that gaging station since streamflow records began in 1886, and was greater than that of a 100-year flood at that site. Peak discharges at several other stream-gaging stations in the area also were greater than those of a 100-year flood at the respective sites. Selected data on stages, discharges, recurrence intervals, and gaging station locations, are given in the accompanying map and table (on page 6). Monthly mean flow of Etowah River at Canton, in the northwestern part of the State, increased seasonally and was above the normal range. In southern Georgia, mean discharge of Alapaha River at Statenville also increased seasonally, was 2 times the median discharge for March, and remained above the normal range for the 2d consecutive month.



Location of stream-gaging stations in Georgia, Alabama, and Mississippi, described in table of peak stages and discharges.

In Alabama, rapid runoff from intense rains on March 3 and 4 resulted in flooding along many streams. Considerable damage to roads and bridges was reported to have occurred in the eastern and southwestern counties of Baldwin, Calhoun, Chambers, Cherokee, Clay, Cleburne, Coosa, Etowah, Randolph, and Tala-poosa. Peak discharges were highest of record and greater than those of a 100-year flood at some stream-gaging stations. Selected data on stages, discharges, recurrence intervals, and gaging-station locations, are given in the accompanying map and table. Monthly mean flows were in the above-normal range at all index stations in the State except in the extreme northern part, where flows increased but remained in the normal range.

In southeastern Mississippi, flooding occurred March 4 and 5 along tributaries of Pascagoula River. Peak discharges were greatest of record at some gaging stations in that basin. For example, the peak discharge of 38,000 cfs on March 4 on Chunky River near Chunky (drainage area, 368 square miles) was the largest observed at that site since records began in 1938, and was equal to that of an 80-year flood discharge there. Selected data on stages, discharges, recurrence intervals, and gaging-station locations, are given in the accompanying map and table. On the mainstem of Pascagoula River at Merrill, monthly mean discharge increased seasonally and remained above the normal range for the 3d consecutive month. Cumulative runoff of this site for the first half of the 1979 water year was in the above-normal range. In Pearl River basin, also in south-eastern Mississippi and the adjacent area of Louisiana, monthly mean flow, as measured near Bogalusa, La., near the Mississippi-Louisiana boundary, decreased, contrary to the normal seasonal pattern of increasing flow, but was 224 percent of the March median discharge and was in the above-normal range for the 3d consecutive month. In west-central Mississippi, monthly mean discharge of Big Black River near Bovina also decreased, contrary to the normal seasonal pattern, but remained within the normal range. Cumulative runoff

FLOOD DATA FOR SELECTED SITES IN GEORGIA, ALABAMA, AND MISSISSIPPI, MARCH 1979

WRD station number	Stream and place of determination	Drainage area (square miles)	Period of known floods	Maximum flood previously known			Maximum during present flood				
				Date	Stage (feet)	Discharge (cfs)	Date	Stage (feet)	Discharge		Recurrence interval (years)
									Cfs	Cfs per square mile	
	GEORGIA										
	SAVANNAH RIVER BASIN										
02178400	Tallulah River near Clayton	56.5	1964–	May 28, 1973	12.00	8,500	Mar. 4	10.1	5,600	99	50
	MOBILE RIVER BASIN										
02381600	Fausett Creek near Talking Rock	9.99	1966–	May 29, 1973	16.96	3,160	4	13.7	2,670	267	100
02382200	Talking Rock Creek near Hinton	120	1973–	May 28, 1973	15.45	18,400	4	14.2	14,200	118	50
02385700	Rock Creek near Chatsworth	3.46	1965–	Apr. 4, 1974	3.88	434	4	5.63	750	217	50
02385800	Holly Creek near Chatsworth	64.9	1961–	Mar. 15, 1964	11.37	6,040	4	12.54	[a]8,000	123	50
02387100	Polecat Creek near Spring Place	1.22	1964–	Mar. 4, 1966	7.75	828	4	7.02	703	576	70
02387560	Oothkalooga Creek tributary at Adairsville	3.56	1965–	Apr. 4, 1977	6.89	1,520	4	7.70	1,850	520	>100
02387700	Rocky Creek at Curryville	9.41	1965–	Apr. 4, 1977	9.00	3,970	4	6.54	2,100	223	100
02388400	Dozier Creek near Shannon	3.00	1965–	Apr. 4, 1977	6.26	1,330	4	5.80	1,170	390	50
02397500	Cedar Creek near Cedartown	109	1886–	Nov. 28, 1948	[b]16.4	8,820	4	19.4	11,000	101	>100
	ALABAMA										
	MOBILE RIVER BASIN										
02399200	Little River near Blue Pond	194	1958–67, 1970–	Mar. 4, 1966	14.45	32,200	4	14.17	30,200	156	45
02408500	Hatchet Creek near Rockford	244	1944–	Jan. 6, 1946	25.9	22,800	4	26.7	30,200	124	50
02412000	Tallapoosa River near Heflin	444	1952–	Mar. 31, 1977	31.34	32,500	4	27.14	20,800	47	25
02414500	Tallapoosa River at Wadley	1,660	1923–	Mar. 16, 1976	27.9	66,900	4	28.23	76,200	46	100
02427700	Turkey Creek at Kimbrough	114	1958–	Dec. 10, 1961	25.02	39,600	4	23.34	19,700	173	25
02468500	Chickasaw Bogue near Linden	258	1944–46, 1965–	Mar. 26, 1945	30.33	33,000	4	31.18	45,000	174	>100
02469800	Satilpa Creek near Coffeeville	166	1956–	July 8, 1956	18.37	25,600	4	17.33	23,500	142	>100
	MISSISSIPPI										
	PASCAGOULA RIVER BASIN										
02471250	Leaf River at Taylorsville	466	1968–	Apr. 14, 1974	257.44	38,000	5	.....	32,000	69	25
02475500	Chunky River near Chunky	368	1938–	Feb. 22, 1961	25.75	30,800	4	26.64	38,000	103	80
02477000	Chickasawhay River at Enterprise	913	1938–	Feb. 23, 1961	42.94	61,700	5	41.88	53,000	58	50

[a]Estimated

[b]Maximum stage known since at least 1886.

for the first half of the 1969 water year at that station also was above the normal range. In the northern part of the State, mean flow of Tombigbee River at Columbus increased and was greater than median but remained within the normal range.

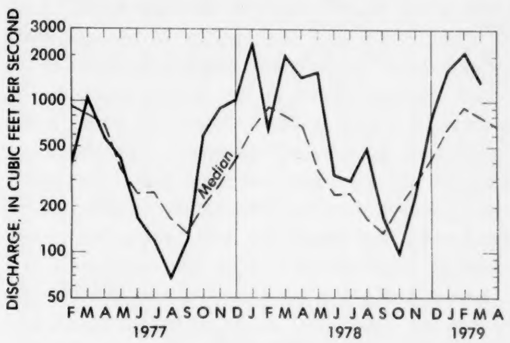
In extreme eastern Tennessee, mean discharge of French Broad River below Douglas Dam increased sharply, was 162 percent of median, and was in the above-normal range. Elsewhere in the State, mean flows were variable and were less than median flows for the month. In north-central Tennessee, cumulative runoff of Harpeth River near Kingston Springs for the first 6 months of the 1979 water year was 165 percent of median and in the above-normal range.

In southern Florida, upstream from Lake Okeechobee, monthly mean discharge of Fisheating Creek at Palmdale increased seasonally, was 8 times the median flow for March, and remained in the above-normal range for the 3d consecutive month. In the east-central part of the State, mean flow of St. Johns River at Christmas was 2 times the March median discharge but was within the normal range. In the Suwannee River basin of northeastern Florida and the adjacent area of Georgia, mean flow of Suwannee River at Branford, Fla., increased seasonally and remained in the normal range but was greater than median for the first time since August 1978. In northwestern Florida, monthly mean discharge of Shoal River near Crestview decreased, contrary to the normal seasonal pattern of increasing flow, but was 171 percent of median and remained above the normal range.

In southern Kentucky, where cumulative runoff for the first half of the 1979 water year in Green River at Munfordville was 215 percent of median runoff for that period, monthly mean flow decreased sharply to 80 percent of median for March. In the northern part of the State, monthly mean flow of Licking River at Catawba also decreased sharply, contrary to the normal seasonal pattern of increasing flow, and was only ½ the median discharge for March. Cumulative runoff at this station for the first 6 months of the 1979 water year was 189 percent of median.

In adjacent West Virginia, mean discharge of Kanawha River at Kanawha Falls increased sharply, as a result of high carryover flow from February and increased runoff in March, was 172 percent of median and was above the normal range. Similarly, in the extreme northern part of the State, mean flow of Potomac River at Paw Paw also increased sharply for the same reasons, was 178 percent of median, and remained above the normal range for the 4th consecutive month. In the eastern part of the State, mean flow of Greenbrier River at Alderson decreased, contrary to the normal seasonal pattern, and was in the normal range but was greater than median for the 4th consecutive month. Cumulative runoff for the first half of the 1979 water-year was above the normal range at all index stations in the State.

In southeastern Virginia, where monthly and daily mean discharges in Nottaway River near Stony Creek were highest for the month in February, monthly mean flow decreased sharply in March but was 164 percent of median and remained above the normal range for the 3d consecutive month. (See graph.) Similarly, in northern



Monthly mean discharge of Nottaway River near Stony Creek, va. (Drainage area, 579 sq mi; 1,500 sq km)

Virginia, where monthly and daily mean discharges in Rapidan River near Culpeper were highest for the month in February, monthly mean flow decreased but was 207 percent of median and remained in the above-normal range for the 3d consecutive month. In the east-central part of the State, mean flow of Slate River near Arvonia also decreased unseasonally and remained above the normal range for the 3d consecutive month. Cumulative runoff for the first half of the 1979 water year was above the normal range at all index stations in the State.

Ground-water levels rose in most of West Virginia, but declined in the east-central quarter of the State. Levels were below average in the central third of the State but were above average elsewhere. In Kentucky, levels rose and were above average statewide, with a new alltime high in the water-table well in the Louisville-Jefferson County area in 33 years of record. In Virginia, levels declined and were above average in the Pilcher water-table well near Petersburg and in the Tyler well in Louisa County; the level declined but was above average in the Bacon-Summerville well in Fairfax County in northern Virginia. In western Tennessee, the artesian level in the key well in the "500-foot sand" near Memphis rose slightly but was nevertheless at a new low for March in 38 years of record and was nearly 16 feet below average, reflecting the general decline in pressure levels caused by continued heavy municipal pumping. Levels in North Carolina declined in the Coastal Plain but rose in the

remainder of the State; levels were above-average statewide. In Mississippi, levels rose moderately statewide. Levels in wells in the Sparta Sand and in the Cockfield Formation rose moderately, and slight rises continued along the Gulf Coast and in southwest Mississippi. Moderate rises also occurred in wells in the Mississippi River alluvial aquifer and in the Wilcox aquifer in northwest Mississippi. In addition, rises occurred in wells in the aquifers of Late Cretaceous age in northeast Mississippi following the record lows that were established in 1978. Levels in Alabama declined by the end of the month owing to deficient rainfall since early March; levels were near average. In Georgia, levels changed little in the Piedmont; trends were mixed in the principal artesian aquifer in the coastal counties. The level declined slightly in the Cockspur Island well, in the Savannah area; the artesian level was at a new March low in 23 years of record and was more than 7 feet below average. Levels in the water-table aquifer near Brunswick declined and a new March low level was reached in one key well. In southwestern Georgia, levels declined 1 to 3 feet. Levels declined in most parts of northern Florida. They rose less than 1 foot in the central peninsula, and declined as much as 2 feet in northwestern Florida. Levels were less than 1 foot below average at Pensacola, Tallahassee, and Orlando, and were 3 feet below average near Tampa and near Mulberry in west-central Polk County. In southeast Florida, levels declined about ½ foot during March; levels ranged from average to 1 foot below average.

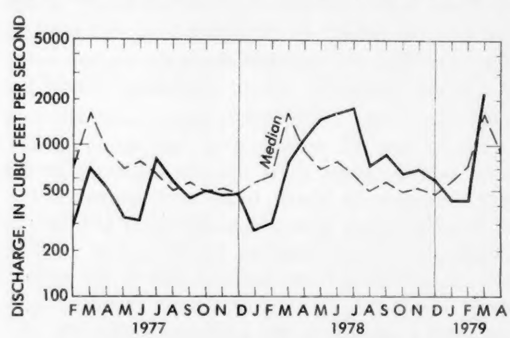
WESTERN GREAT LAKES REGION

[Ontario; Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin]

Streamflow generally increased seasonally except in Ohio and Ontario, where mean flows were variable. Monthly mean discharges remained in the above-normal range in parts of Illinois, Ohio, and Wisconsin, and increased into that range in parts of Ontario, Indiana, and Michigan. Below-normal flows persisted in parts of Ontario. Flooding occurred in parts of Illinois, Indiana, and Wisconsin.

Ground-water levels rose in most of the region, but trends were mixed in Minnesota and Michigan. Levels were somewhat below average in Ohio, above average in Wisconsin and Illinois, and mixed with respect to average in Minnesota and Michigan.

In Illinois, extensive flooding was reported to have occurred along the Illinois, Fox, Kankakee, and Rock Rivers, and in other scattered stream basins. Ice jams were cited as the cause of most of the flooding on the Kankakee and Iroquois Rivers, and rapid runoff of rain and melting snow caused most of the flooding along other streams. Record flow was reported to have occurred on the Illinois River from its headwaters to near Peoria. In the north-central part of the State, the Fox River at Dayton (drainage area, 2,642 square miles), tributary to Illinois River southwest of Chicago, crested on March 20 at a discharge rate of 28,400 cfs, equivalent to that of a 25-year flood at that site. In western Illinois, the peak discharge of 10,000 cfs on Green River near Geneseo (drainage area, 1,003 square miles), tributary to Rock River, on March 21, was equivalent to that of a 10-year flood event. In extreme northern Illinois, Kishwaukee River at Belvidere (drainage area, 538 square miles), tributary to Rock River, crested at 9,000 cfs on March 21, equal to that of a 25-year flood at Belvidere. In the northeastern part of the State, Kankakee River at Momence crested on March 9 at 10,000 cfs, also equal to that of a 25-year flood event there. Downstream from Peoria, the Illinois River crested at Kingston Mines on March 25 at 75,000 cfs, equal to that of a 50-year flood. The monthly mean flow of Rock River near Joslin increased sharply, as a result of the rapid runoff from rain and melting snow, was 177 percent of the median discharge for March, and was above the normal range. Mean flow of Pecatonica River at Freeport (tributary to Rock River) also increased sharply but was in the normal range. (See graph.) In the



Monthly mean discharge of Pecatonica River at Freeport, Ill. (Drainage area, 1,326 sq mi; 3,434 sq km)

central part of the State, mean flow of Sangamon River at Monticello increased from 71 percent of median in February to 534 percent of median in March, and was in the above-normal range. In southern Illinois, monthly mean discharge of Skillet Fork at Wayne City also increased seasonally and remained in the above-normal range for the 3d consecutive month. Cumulative runoff for the first half of the

(Continued on page 10.)

SELECTED DATA FOR THE GREAT LAKES, GREAT SALT LAKE, AND OTHER HYDROLOGIC SITES

GREAT LAKES LEVELS

Water levels are expressed as elevations in feet above International Great Lakes Datum 1955

(Data furnished by National Ocean Survey, NOAA, via U.S. Army Corps of Engineers office in Detroit. To convert data to elevations above mean sea level datum of 1929, add the following values: Superior, 0.96; Michigan-Huron, 1.20; St. Clair, 1.24; Erie, 1.57; Ontario, 1.22.)

Lake	March 31, 1979	Monthly mean, March		March		
		1979	1978	Average 1900–75	Maximum (year)	Minimum (year)
Superior (Marquette, Mich.)	600.20	599.96	600.28	599.99	600.97 (1975)	598.32 (1926)
Michigan and Huron (Harbor Beach, Mich.)	578.31	578.49	578.12	577.74	579.98 (1973)	575.35 (1964)
St. Clair (St. Clair Shores, Mich.)	574.21	574.09	574.39	572.68	575.75 (1973)	570.41 (1934)
Erie (Cleveland, Ohio)	571.24	570.93	571.33	569.95	572.88 (1973)	567.65 (1934)
Ontario (Oswego, N.Y.)	245.18	244.77	245.52	244.34	246.77 (1952)	242.08 (1935)

GREAT SALT LAKE

Alltime high: 4,211.6 (1873). Alltime low: 4,191.35 (October 1963).	March 31, 1979	March 31, 1978	Reference period 1904–78		
			March average, 1904–78	March maximum (year)	March minimum (year)
Elevation in feet above mean sea level:	4,199.65	4,199.80	4,198.7	4,204.90 (1924)	4,192.40 (1963)

LAKE CHAMPLAIN, AT ROUSES POINT, N.Y.

Alltime high (1827–1977): 102.1 (1869). Alltime low (1939–1977): 92.17 (1941).	March 29, 1979	March 31, 1978	Reference period 1939–75		
			March average, 1939–75	March max. daily (year)	March min. daily (year)
Elevation in feet above mean sea level:	99.70	97.43	95.88	100.68 (1976)	93.63 (1940)

FLORIDA

Site	March 1979		February 1979	March 1978
	Discharge in cfs	Percent of normal	Discharge in cfs	Discharge in cfs
Silver Springs near Ocala (northern Florida)	710	94	710	770
Miami Canal at Miami (southeastern Florida)	157	86	228	325
Tamiami Canal outlets, 40-mile bend to Monroe	28	510	51	442

(Continued from page 8.)
1979 water year at Monticello and Wayne City was in the above-normal range.

In Indiana, much of the snow cover in the southern two-thirds of the State melted during February but about 20 inches of snow remained on the ground in the northern one-third of the State at the beginning of March. Thawing temperatures, and rainfall of about 1½ inches during the first week of the month, caused rapid runoff and flooding along streams in the northern part of the State. Damages were reported to be greatest in the lower reaches of Kankakee River, where ice jams contributed to the flooding. For example, on Kankakee River at Shelby, tributary to Illinois River, in northwestern Indiana, the peak stage on March 4, resulting from an ice jam, was 0.2 foot higher than the previous maximum in record that began in 1923. Also in the northwestern part of the State, peak stages on Galena River near La Porte, Trail Creek at Michigan City, Slough Creek near Collegeville, and Little Calumet River at Munster were higher than any previously observed stages at those sites. And in west-central Indiana, the peak stages that occurred March 4 on Mud Pine Creek near Oxford and Big Walnut Creek at Greencastle also were highest of record. Monthly mean discharges increased sharply and were above the normal range at all index stations in the State. On the Wabash River in western Indiana, the mean flow of 108,100 cfs at the index station at Mt. Carmel, Ill., was highest for March since records began in October 1927. Also at Mt. Carmel, the daily mean discharge of 170,000 cfs on March 12 was only 6 percent less than the maximum daily mean of record for the month. In the eastern part of the State, monthly mean flows of Mississinewa River at Marion and East Fork White River at Shoals increased sharply, were 1½ and 2 times the respective March median discharges, and were in the above-normal range. The cumulative runoff for the first 6 months of the 1979 water year was above the normal range in Wabash River at Mt. Carmel and East Fork White River at Shoals.

In central Ohio, where the daily mean discharge of 57,000 cfs on Scioto River at Higby on February 26 was highest for that month since records began in 1930, monthly mean flow increased sharply in March, as a result of the high carryover flow from February and the increased runoff from rains early in March, and was above the normal range. In the northwestern part of the State, monthly mean discharge of Maumee River at Waterville also increased sharply and was above the normal range for the first time in 8 months. In east-central Ohio, mean flow of Little Beaver Creek near East Liverpool decreased, contrary to the normal seasonal pattern of increasing flow, and was in the normal range following 3 consecutive months of flow in the above-normal range. Cumulative runoff during the first 6 months of the 1979 water year at the East Liverpool and Waterville index stations was above the normal range.

In the southern part of Michigan's Lower Peninsula, where monthly mean discharge of Red Cedar River at East Lansing was below the normal range and only 37 percent of median in February, mean discharge increased sharply in March as a result of runoff from rains early in the month, and was 132 percent of median. In the northern part of the Lower Peninsula, mean flow of Muskegon River at Evart also increased sharply, as a result of runoff from rains during the latter half of the month. The monthly mean discharge of 2,610 cfs at Evart was 190 percent of the March median, was in the above-normal range, and was 4th highest for March in 47 years of record. Lake levels in this part of the State generally were below normal at monthend. In the Upper Peninsula, monthly mean flow of Sturgeon River near Sidnaw increased seasonally and remained within the normal range for the 5th consecutive month.

In southwestern Ontario, monthly mean discharge of English River at Umfreville increased slightly and was in the normal range but remained below median for the 5th consecutive month. In the eastern part of the Province, mean flow of Missinaibi River at Mattice continued to decrease seasonally and was below the normal range for the 3d time in the past 4 months. In southeastern Ontario, monthly flow of Saugeen River near Port Elgin increased sharply, as a result of runoff from rain and snowmelt late in March, was 171 percent of median and was above the normal range for the first time since September 1978.

In northwestern Wisconsin, monthly mean flow of Jump River at Sheldon increased seasonally, as a result of runoff from rain and melting snow near monthend, was 3½ times the March median discharge, and remained in the above-normal range for the 3d consecutive month. Also in the northwestern part of the State, mean flow of Chippewa River at Chippewa Falls increased sharply and was above the normal range for the first time since October 1978. Similarly, in west-central Wisconsin, mean flow of Wisconsin River at Muscoda increased and was in the above-normal range for the first time since October 1978. In the eastern part of Wisconsin, mean discharges of Oconto River near Gillett and Fox River at Rapide Croche Dam near Wrightstown increased seasonally and were above the normal range. Cumulative runoff at these two stations for the first 6 months of the 1979 water year was above the normal range. In southeastern Wisconsin, rapid runoff from rain and melting snow resulted in a flood-peak discharge of 5,000 cfs on Rock River at Watertown on March 31.

This discharge is equivalent to that of a 60-year flood event at Watertown.

In central Minnesota, monthly mean flow of Mississippi at Anoka increased seasonally but remained in the normal range and was slightly greater than median. Also in the central part of the State, mean discharge of Crow River at Rockford increased seasonally and was 160 percent of median but was in the normal range. Similarly, in western Minnesota, mean flow of Buffalo River near Dilworth also increased seasonally, was 171 percent of median, but remained in the normal range. In the extreme northern part of the State, monthly mean flow at the international gaging station, Rainy River at Manitou Rapids, on the Minnesota-Ontario boundary, also increased seasonally, was greater than median for the first time in 4 months, and was in the normal range.

Ground-water levels in shallow water-table wells in Minnesota declined and continued below average. Artesian levels in the Minneapolis-St. Paul area showed little change and continued above average. Levels in Wisconsin generally rose and were average or slightly above average. Levels in Michigan rose in the Lower Peninsula but declined in the Upper Peninsula. They were generally below average in parts of the southern Lower Peninsula but were near or above average elsewhere. In Illinois, the level in the shallow index well in glacial drift at Princeton, Bureau County, rose more than 6 feet and was more than 5 feet above average. In Ohio, levels generally rose; they were slightly below average in the northeast, and below average in the central part of the State.

MIDCONTINENT

[Manitoba and Saskatchewan; Arkansas, Iowa, Kansas, Louisiana, Missouri, Nebraska, North Dakota, Oklahoma, South Dakota, and Texas]

Streamflow generally increased seasonally except in Manitoba and Louisiana, where flows generally decreased, and in Missouri, where flows were variable. Monthly mean discharge remained in the above-normal range in parts of Louisiana and Texas, and increased into that range in parts of Arkansas, Iowa, Kansas, Missouri, Nebraska, and South Dakota. Mean flows were highest of record in parts of Iowa, Missouri, and Texas. Flooding occurred in parts of Iowa, Louisiana, Missouri, Nebraska, and South Dakota.

Ground-water levels rose in the region except in Louisiana and Texas, where trends were mixed. Levels were above and below average except in Nebraska and Iowa, where they were generally above average. New low levels for March were reached in wells in Kansas, Arkansas, Louisiana, and Texas. A new alltime low was recorded in the key well in the Texas Panhandle.

In eastern Nebraska, about 15,000 acres of farmland and about 120 summer homes and cabins were reported to have been inundated by floodwater along the Platte and Elkhorn Rivers. Ice jams caused some of the flooding. Highway 79 near North Bend was damaged when water and ice from the Platte River flowed over the roadway. The peak discharge of 20,000 cfs on Platte River at North Bend (drainage area, 77,100 square miles) was about the equivalent of a 5-year flood discharge at that site. Monthly mean discharge of Elkhorn River at Waterloo increased sharply, was 334 percent of the March median discharge, and was in the above-normal range after 6 consecutive months of mean flow in the below-normal range. In the northwestern part of the State, mean discharge of Niobrara River above Box Butte Reservoir increased seasonally and was in the normal range after 4 consecutive months in the below-normal range. In southwestern Nebraska, mean flows of unregulated streams in the Republican River basin were reported to be 70 to 90 percent of normal, and reservoirs in that basin were reported to be filling slowly. Mean flows in the north-central part of the State were greater than March medians but were within the normal range.

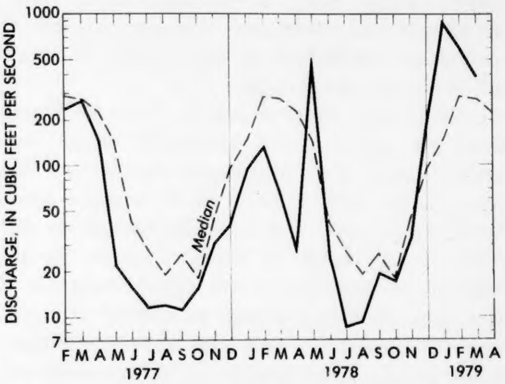
In southwestern Iowa, ice jams caused extensive flooding of farmland along Nishnabotna River near Riverton and Hamburg early in the month. At the index station, Nishnabotna River above Hamburg, the monthly mean discharge of 8,135 cfs was 532 percent of median and highest for March since records began in March 1922. Monthly mean flow was above the normal range in 4 of the first 6 months of the 1979 water year and cumulative runoff for that 6-month period was in the above-normal range at that site. Flooding occurred also in northwestern Iowa where the peak discharge of 12,800 cfs, on March 25, on North Raccoon River near Sac City (drainage area, 713 square miles) was the greatest in 21 years of record and was equal to that of a 100-year flood at that site. Also in the northwestern part of the State, the peak discharge of 13,400 cfs, March 22, on Floyd River at Alton (drainage area, 265 square miles) was the greatest in 24 years of record and was equal to that of a 25-year flood. Also in Floyd River basin, the peak discharge of 9,000 cfs, March 22, on West Branch Floyd River near Struble (drainage area, 181 square miles) was the greatest observed at that site in 24 years of record. Also in northwestern Iowa, mean discharge of Des Moines River at Fort Dodge increased sharply, from 55 percent of median in February to 356

percent of median in March and was above the normal range. In the west-central part of the State, the peak discharge of 430 cfs, March 18, on East Fork Hardin Creek near Churdan (drainage area, 24.0 square miles) was the greatest observed in 27 years of record. In eastern Iowa, many streams reached bankfull stages during the month and minor flooding occurred in some low areas. The peak discharge of 8,000 cfs, March 19, on Prairie Creek at Fairfax (drainage area, 178 square miles) was the greatest observed there in 13 years of record. The monthly mean discharge of Cedar River at Cedar Rapids increased sharply, from 61 percent of median in February to 203 percent of median in March.

In northern Missouri, ice jams caused flooding of farmland along the Grand, Nodaway, Tarkio, and One Hundred and Two Rivers early in the month. Near monthend, flooding was reported in the lower reaches of Meramec River, at Arnold, as a result of backwater from the Mississippi River. In the Grand River basin in northwestern Missouri, the monthly mean discharge of 5,785 cfs at the index station near Gallatin (drainage area, 2,250 square miles) was highest for March since records began in 1921, and was 485 percent of the median flow for March. In the south-central part of the State, mean flow of Gasconade River at Jerome decreased from the relatively high flow of February but remained in the normal range for the 12th consecutive month.

In northern Arkansas, monthly mean flow of Buffalo River near St. Joe increased sharply into the above-normal range and was 224 percent of median. In the southern part of the State, mean discharge of Saline River near Rye also increased seasonally and was above the normal range for the 4th time in the past 6 months. Cumulative runoff at that site during the first 6 months of the 1979 water year was in the above-normal range and was 193 percent of median.

In southeastern Louisiana, and the adjacent area of southern Mississippi, the monthly mean discharge of 39,150 cfs on Pearl River near Bogalusa, La. (drainage area, 6,630 square miles), was highest for March since records began in 1938, and the peak discharge of 56,500 cfs on March 11 was equivalent to that of a 5-year flood event at that site. Daily mean stages exceeded the National Weather Service flood stage (15 feet) at this site during the entire month. Also in southeastern Louisiana, mean flow of Amite River near Denham Springs decreased and was in the normal range but cumulative runoff for the first 6 months of the 1979 water year was in the above-normal range. On Red River at Alexandria, the peak discharge of 101,000 cfs, March 7, was equivalent to that of a 5-year flood. At Baton Rouge, daily mean stages of Mississippi River were above the National Weather Service flood stage (35 feet) from March 15th through the 31st, and the peak discharge of 1,219,000 cfs on the 19th was equivalent to that of a 5-year flood. Monthly mean discharge of Saline Bayou near Lucky, in northwestern Louisiana, decreased seasonally, but remained in the above-normal range as a result of high carryover flow from February, augmented by increased runoff from rains early in March. (See graph.) Cumulative runoff at this station during the first half of the 1979 water year was 190 percent of median and in the above-normal range. In the west-central part of the State, monthly mean flow of Calcasieu River near Oberlin also decreased into the normal range, after 2 consecutive months of flow in the above-normal range.



Monthly mean discharge of Saline Bayou near Lucky, La.
(Drainage area, 154 sq mi; 399 sq km)

In central Texas, mean discharge of Guadalupe River near Spring Branch (drainage area, 1,315 square miles) increased sharply, was 792 percent of median, and remained in the above-normal range for the 7th time in the past 8 months. The monthly mean flow of 1,371 cfs, and the daily mean of 4,530 cfs on the 21st, were highest for March since records began in June 1922. Cumulative runoff at that site for the first 6 months of the 1979 water year was 420 percent of median and above the normal range. In the eastern part of the State, mean discharge of Neches River near Rockland increased, was 224 percent of median, and was in the above-normal range for the first time since October 1976. In western Texas, monthly mean discharge of North Concho River near Carlsbad also increased, was 222 percent of median, and was above the normal range for the first time since August 1978. Mean flows continued to be below the normal range in the Canadian River basin and in parts of the Brazos and Red River basins, but were above the normal range in the Nueces

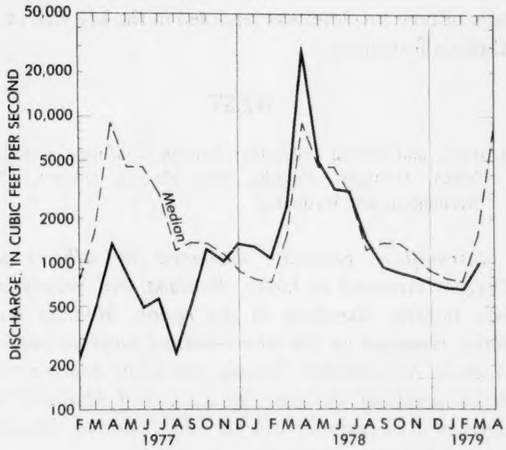
River basin and in the lower parts of the Trinity, Brazos, and Colorado River basins. Elsewhere in the State, flows were in the normal range.

In Oklahoma, monthly mean flows were greater than median as a result of runoff from rains during the period March 18–22. Mean discharge of Washita River near Durwood increased from 53 percent of median in February (below the normal range), to 112 percent of median in March (in the normal range). Monthly discharge was below the normal range in 4 of the first 6 months of the 1979 water year and cumulative runoff near Durwood during that 6-month period was only 39 percent of median.

In Kansas, monthly mean flows increased significantly over most of the State as a result of runoff from above-normal rainfall. In the northwestern part of the State, mean discharge of Saline River near Russell increased sharply, from 13 percent of median in February (below the normal range), to 884 percent of median in March, and was above the normal range for the first time since August 1975. Monthly discharges were below the normal range during 25 of the 33 months, from June 1976 through February 1979, at that index station. In the southwestern part of the State, monthly mean flow of Arkansas River at Arkansas City increased sharply, from 27 percent of median in February to 569 percent of the median for March, and was in the above-normal range again for the first time since March 1978.

In eastern South Dakota, monthly mean discharge of Big Sioux River, as measured at Akron, Iowa, on the South Dakota-Iowa boundary, increased sharply, from 60 percent of median in February to 333 percent of median in March, and was above the normal range. Some lowland flooding occurred along Big Sioux River in March. Cumulative runoff for the first half of the 1979 water year was 203 percent of median at Akron. In the central part of the State, flow resumed in Bad River near Fort Pierre on March 10 and continued through the remainder of the month. Mean flow there during March was only 13 percent of median but was within the normal range.

In southwestern North Dakota, mean discharge of Cannonball River at Breien increased seasonally but remained in the normal range. Similarly, in the eastern part of the State, mean flow of Red River of the North at Grand Forks increased seasonally and remained in the normal range, but was less than median for the 7th consecutive month. (See graph.) Below-normal temperatures and above-normal precipitation reportedly have persisted over much of the State for the past 5 months and moderate to heavy snow cover was reported at monthend in all areas except the southwest.



Monthly mean discharge of Red River of the North at Grand Forks, N. Dak. (Drainage area, 30,100 sq mi; 78,000 sq km)

In southeastern Saskatchewan, monthly mean flow o Qu'Appelle River near Lumsden increased seasonally bu remained in the normal range for the 8th consecutive month.

In southern Manitoba, mean discharge of Waterhen River below Waterhen Lake continued to decrease and was only 32 percent of the median flow for March but remained within the normal range for the 30th consecutive month. The level of Lake Winnipeg at Gimli averaged 714.00 feet above mean sea level for the month, 0.10 foot lower than last month, 1.41 feet higher than last March, 1.02 feet higher than the long-term average for March, and 2.26 feet lower than the maximum March mean for the period of record that began in May 1913 at Winnipeg Beach.

Ground-water levels in North Dakota rose and were above average in the west and rose but were below average in the east. Levels in Nebraska rose statewide and were near or above average. In Iowa, levels rose and were above average statewide. Levels rose in Kansas, and locally were below average; a new low for March was recorded in one of the key wells. Levels generally rose in Arkansas. New low levels for March were recorded in key wells in the Sparta Sand at Stuttgart, in 12 years of record, and at Pine Bluff, in 21 years of record. Elsewhere in Arkansas, levels were above and below average. In Louisiana, trends were mixed; a new March low level occurred in the key well at Iowa, La., in Jefferson Davis County, in 39 years of record. In Texas, levels rose and were above average in wells in the Edwards aquifer in Austin and San Antonio. Levels declined and were below average in wells in the Evangeline aquifer at Houston and in the bolson deposits in El Paso. A new low level for March was reached at El

Paso in 21 years of record. In the Texas Panhandle, a new alltime low level was recorded in the key well in the Ogallala formation.

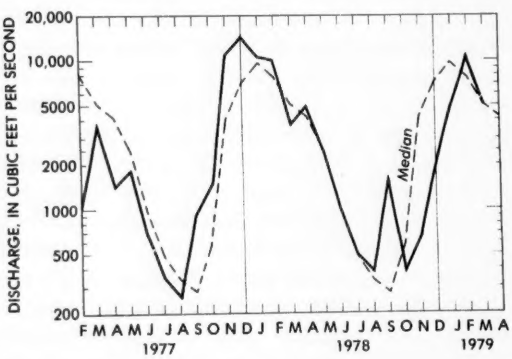
WEST

[Alberta and British Columbia; Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming]

Streamflow generally decreased in Alberta and Oregon, increased in Idaho, Montana, and Nevada, and was variable elsewhere in the region. Monthly mean flows remained in the above-normal range in parts of Arizona, New Mexico, Nevada, and Utah. Below-normal flows persisted in parts of Utah and Montana and developed in parts of Alberta and Colorado. Flooding occurred in parts of Montana.

Ground-water levels rose in Washington, and rose in most of the key wells in southern California and Utah; trends were mixed in other States in the region. Levels were near or below average in Washington, below average in Idaho, and only slightly below average in Montana; they were above and below average in other States. A new high level for March was reached in Nevada, and new March lows occurred in Washington, Idaho, Nevada, Arizona, and New Mexico.

In north-coastal California, where monthly mean flow of Smith River near Crescent City was above the normal range during February, flow decreased seasonally during March to 97 percent of median and was in the normal range. (See graph.) Cumulative runoff for the first 6



Monthly mean discharge of Smith River near Crescent City, Calif. (Drainage area, 609 sq mi; 1,577 sq km)

months of the 1979 water year at that site was only 62 percent of median and below the normal range for that period. In the southern Sierra Nevada west slope, mean flow of Kings River above North Fork, near Trimmer, increased seasonally to 161 percent of median and was above the normal range. Cumulative runoff for the first half of the 1979 water year at that site and at the remaining index stations in the State was within the normal range and ranged from 72 percent of median at North Fork American River at North Fork Dam to 200 percent of median at Arroyo Seco near Pasadena. Combined contents of 10 reservoirs in northern California were 107 percent of average and 111 percent of that of a year ago.

In southern Nevada and the adjacent areas of Arizona and Utah, monthly mean flow in Virgin River as measured at Littlefield, Ariz., increased, in contrast to the normal seasonal pattern of decreasing flow, and remained in the above-normal range for the 2d consecutive month. In north-central Nevada, monthly mean discharge in Humboldt River at Palisade increased seasonally to 2½ times median and remained in the above-normal range for the 3d consecutive month. Cumulative runoff for the first half of the 1979 water year at Palisade was in the above-normal range.

In northeastern Utah, mean flow in Whiterocks River near Whiterocks continued to decrease and remained in the below-normal range for the 6th consecutive month. Similarly, monthly mean discharge of Weber River, as measured near Oakley, also continued to decrease and was below the normal range. Cumulative runoff during the first 6 months of the 1979 water year at both sites was below the normal range. In contrast, monthly mean flows of Colorado River near Cisco, in the east-central part of the State, and San Juan River near Bluff, in southeastern Utah, increased seasonally and remained in the above-normal range. Elsewhere in the State, streamflow increased seasonally and was within the normal range.

In southeastern Arizona, monthly mean flow of San Pedro River at Charleston decreased seasonally but remained in the above-normal range for the 6th consecutive month as a result of high carryover flow from February. In Verde River basin, in central Arizona, mean flow at the station below Tangle Creek, above Horseshoe Dam, increased sharply and remained in the above-normal range for the 5th consecutive month. Similarly, in the northeastern part of the State, monthly mean flow of Little Colorado River near Cameron remained in the above-normal range for the 5th consecutive month and was 430 percent of median. In east-central Arizona, where mean flow of Salt River near Roosevelt was in the above-normal range in 4 of the past 5 months, monthly mean flow remained in that range during March and was almost 4 times median. In Gila River basin, the mean discharge at the station at head of Safford Valley, near Solomon, decreased in contrast to the normal seasonal

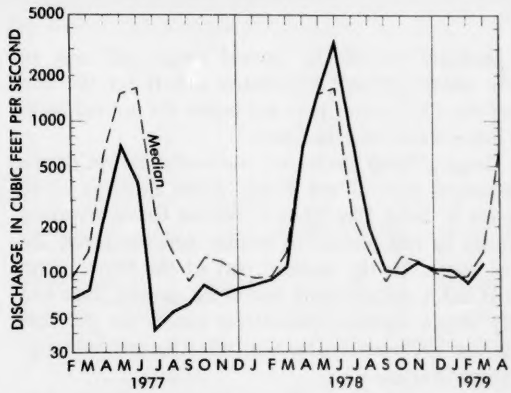
pattern of increasing flows, but remained in the above-normal range and was over 6 times median. Cumulative runoff for the first 6 months of the 1979 water year was above the normal range at all index stations and ranged from about 5 times median on Verde River to over 17 times median on Gila River as measured near Solomon.

In northern New Mexico, where monthly mean flows during December, January, and February in Rio Grande below Taos Junction Bridge, near Taos, were below the normal range, flow increased sharply in March and was above the normal range at over 1½ times median. In the north-central part of the State, mean flow of Pecos River near Pecos increased seasonally and remained in the above-normal range. In the southeastern part of the State, monthly mean discharge of Delaware River near Red Bluff decreased seasonally, but remained in the above-normal range for the 7th consecutive month. In the Gila River basin in southwestern New Mexico, where monthly mean discharge in February as measured at Gila was highest of record for the month, flow decreased in March but remained in the above-normal range for the 5th consecutive month. Cumulative runoff for the first 6 months of the 1979 water year at Gila was more than 8 times median and above the normal range.

In central Colorado and east of the Continental Divide, where mean flow of Bear Creek at Morrison was in the below-normal range in 8 of the past 9 months, monthly mean discharge remained the same as in February, was in the below-normal range, and was only 75 percent of median. Also in central Colorado but west of the Divide, monthly mean flow in Roaring Fork River at Glenwood Springs decreased, in contrast to the normal seasonal pattern of increasing flows, and was below the normal range. In the Animas River basin of southwestern Colorado, monthly mean discharge of Animas River at Durango increased seasonally and was above the normal range for the first time since August 1975. In the northwestern part of the State, where mean flow of Yampa River at Steamboat Springs was below the normal range in February, streamflow increased seasonally and was within the normal range for the 6th time in the past 7 months. (See graph.)

In Wyoming, streamflow decreased seasonally in the Tongue River basin and increased seasonally in the North Platte River basin with monthly mean discharges near or slightly above median and within the normal range.

In Montana, localized flooding was reported along the lower reaches of the Milk and Yellowstone Rivers as a result of snowmelt runoff and associated ice jams. Damages were reported to be greatest in the Miles City area where 150 families were evacuated when the



Monthly mean discharge of Yampa River at Steamboat Springs, Colo. (Drainage area, 604 sq mi; 1,564 sq km)

Yellowstone River reached its 2d highest stage of record on March 15. The peak stage of 20.75 feet was the result of an ice jam that destroyed the gaging station at Miles City and was about 1 foot lower than the maximum stage of record that occurred on March 20, 1944. Upstream, on the Yellowstone River at Corwin Springs, monthly mean flow increased seasonally but remained in the below-normal range. In the northwestern part of the State, mean flows of Middle Fork Flathead River near West Glacier and Marias River near Shelby increased sharply and were above the normal range for the first time since September 1978.

In Idaho, streamflow was within the normal range throughout the State and ranged from 105 percent of median on the Snake River near Heise to 136 percent of median on Clearwater River at Spalding. Reservoir storage for irrigation in southern Idaho was above average, while storage in northern Idaho remained below average.

In southwestern Alberta, monthly mean flow of Bow River at Banff continued to decrease seasonally and was below the normal range for the first time since August 1978. In the western part of the Province, mean flow of Athabasca River at Hinton also continued to decrease seasonally but was in the normal range and was greater than median for the 7th consecutive month.

In southern British Columbia, mean flow increased contrary to the normal seasonal pattern of decreasing flow, was 122 percent of median, and above the normal range for the first time since April 1977. Elsewhere in the Province, mean flows generally decreased, were near median and within the normal range.

In northwestern Washington, monthly mean flow of Skykomish River near Gold Bar increased sharply to 200 percent of median and was in the above-normal range. Streamflow at the remaining index stations in the State

was generally within the normal range and near or slightly above median. Cumulative runoff for the first half of the 1979 water year was below the normal range at all index stations in the State.

In Oregon, flows decreased seasonally except in the north-central part of the State, where monthly mean discharge in John Day River at Service Creek increased seasonally to 182 percent of median and was above the normal range. In the western part of the State, mean flows at index stations were within the normal range and slightly above median. Cumulative runoff for the first half of the 1979 water year was below the normal range in western Oregon.

Ground-water levels in Washington rose. The level in the key well in the Spokane Valley was slightly below average; despite a rise of ¾ foot in the Sumas well in western Washington, the level was more than 5 feet below average, setting a new low for March in 39 years of record. In Idaho, the level in the index well in the sand and gravel aquifer in the Boise Valley declined slightly and continued slightly below average. Levels in key wells reached new March lows near Atomic City and Eden——despite a slight rise in the Atomic City well. Levels were below average also in key wells near Rupert and Gooding. The level representative of the alluvial aquifer underlying the Rathdrum Prairie, northern Idaho, rose slightly but was nearly 8 feet below average. Levels in Montana declined slightly and continued slightly below-average in the key wells at Missoula and Hamilton. In southern California, the level in key wells in Santa Ynez Valley and Upper Cuyama Valley in Santa Barbara County rose and continued above average, while in Santa Maria Valley the level in the key well declined and was below average. In Los Angeles and Orange Counties, levels in key wells rose but were below average. In Nevada, the level in the Las Vegas Valley well declined to a new March low in 33 years of record. Levels in key wells in Paradise Valley and Truckee Meadows declined and were below average; the level in the Steptoe Valley well rose and reached a new high level for March in 29 years of record. In Utah, levels generally rose except in the Logan area, where they declined. Levels continued below average in the Holladay and Flowell areas, and above average in the Logan and Blanding areas. In Arizona, levels declined in three index wells and rose in two. A new March low level was reached in the well in the Elfrida area, in 28 years of record. In New Mexico, levels rose but were below average in the Lovington, Hagerman West, and Hrna wells, and declined but was above average in the Berrendo-Smith well. The level in the Dayton well declined slightly and reached a new low for March in 41 years of record.

ALASKA

Streamflow increased notably in the lowlands of south-central Alaska because of warm temperatures and runoff from rain falling on melting snow. Monthly mean flow of Little Susitna River at Palmer, in this area, remained in the above-normal range. Also, mean flow in Gold Creek at Juneau, in the southeast-coastal area, increased sharply as a result of the above-normal temperatures and rain. Monthly mean discharge of Tanana River at Nenana, in east-central Alaska, increased, contrary to the normal seasonal pattern of decreasing flow, and was above the normal range. Also in the east-central part of the State, mean flow of Chena River at Fairbanks decreased seasonally and remained below median for the 12th consecutive month. In the south-coastal basin of Kenai River, monthly mean discharge at Cooper Landing also decreased seasonally but was slightly greater than the median flow for March. Cumulative runoff for the first 6 months of the 1979 water year was above the normal range in Gold Creek at Juneau, below the normal range in Chena River at Fairbanks, and within the normal range elsewhere in the State.

Ground-water levels in the confined aquifer rose 1 to 11 feet in the northern sector of Anchorage and fell 1 to 3 feet in the southern sector because of a shift in pumping for municipal supply to the North Fork Campbell Creek well field.

HAWAII

Streamflow decreased, contrary to the normal seasonal pattern of increasing flow in March, at all index stations in the State. Monthly mean flow of East Branch of North Fork Wailua River near Lihue, island of Kauai, decreased from 342 percent of median in February (above the normal range) to 60 percent of median in March (below the normal range). On the island of Oahu, mean flow of Kalihi Stream near Honolulu decreased from 450 percent of median in February (above the normal range) to 75 percent of median in March (within the normal range). Similarly, on the island of Hawaii, mean discharge of Waiakea Stream near Mountain View decreased from 568 percent of median in February (above the normal range) to 135 percent of median in March (in the normal range). Severe flooding occurred in the town of Hilo in this basin during February. On the island of Maui, monthly mean flow of Honopou Stream near Huelo also decreased unseasonally and was less than the median flow for March but remained within the normal range. Cumulative runoff for the first half of the 1979 water year was above the normal range at index stations on the islands of Maui and Hawaii, and was in the normal range at the index stations on the islands of Kauai and Oahu.

Provisional data; subject to revision

USABLE CONTENTS OF SELECTED RESERVOIRS NEAR END OF MARCH 1979

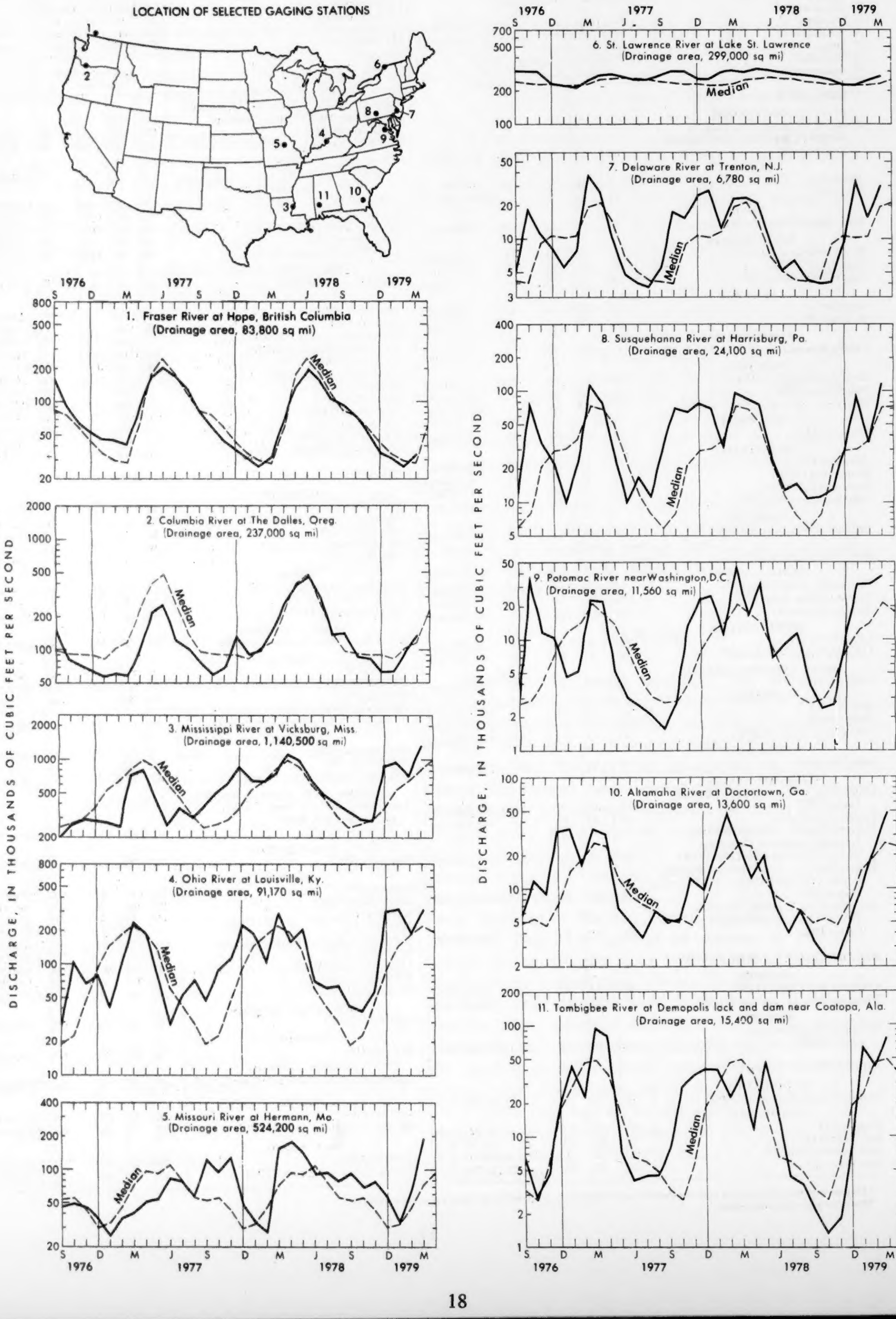
[Contents are expressed in percent of reservoir capacity. The usable storage capacity of each reservoir is shown in the column headed "Normal maximum."]

Reservoir Principal uses: F–Flood control I–Irrigation M–Municipal P–Power R–Recreation W–Industrial	End of Feb. 1979	End of Mar. 1979	End of Mar. 1978	Average for end of Mar.	Normal maximum
	Percent of normal maximum				
NORTHEAST REGION					
NOVA SCOTIA					
Rossignol, Mulgrave, Falls Lake, St. Margaret's Bay, Black, and Ponhook Reservoirs (P)	66	78	64	163	226,300 (a)
QUEBEC					
Allard (P)	19	36	20	29	280,600 ac-ft
Gouin (P)	44	40	56	43	6,954,000 ac-ft
MAINE					
Seven reservoir systems (MP)	34	59	43	34	178,500 mcf
NEW HAMPSHIRE					
First Connecticut Lake (P)	22	29	[b]4	14	3,330 mcf
Lake Francis (FPR)	33	32	14	19	4,326 mcf
Lake Winnipesaukee (PR)	48	77	56	63	7,220 mcf
VERMONT					
Harriman (P)	15	31	18	33	5,060 mcf
Somerset (P)	63	70	43	51	2,500 mcf
MASSACHUSETTS					
Cobble Mountain and Borden Brook (MP)	72	94	70	77	3,394 mcf
NEW YORK					
Great Sacandaga Lake (FPR)	36	84	29	47	34,270 mcf
Indian Lake (FMP)	31	68	46	48	4,500 mcf
New York City reservoir system (MW)	83	97	96	......	547,500 mg
NEW JERSEY					
Wanaque (M)	94	101	104	90	27,730 mg
PENNSYLVANIA					
Allegheny (FPR)	10	47	33	33	51,400 mcf
Pymatuning (FMR)	89	98	95	93	8,191 mcf
Raystown Lake (FR)	67	70	68	49	33,190 mcf
Lake Wallenpaupack (PR)	50	68	54	64	6,875 mcf
MARYLAND					
Baltimore municipal system (M)	104	101	101	93	85,340 mg
SOUTHEAST REGION					
NORTH CAROLINA					
Bridgewater (Lake James) (P)	91	100	90	89	12,580 mcf
Narrows (Badin Lake) (P)	100	100	99	101	5,616 mcf
High Rock Lake (P)	100	100	100	83	10,230 mcf
SOUTH CAROLINA					
Lake Murray (P)	90	90	89	78	70,300 mcf
Lakes Marion and Moultrie (P)	80	87	85	80	81,100 mcf
SOUTH CAROLINA--GEORGIA					
Clark Hill (FP)	92	81	77	73	75,360 mcf
GEORGIA					
Burton (PR)	81	89	78	83	104,000 ac-ft
Sinclair (MPR)	94	79	80	89	214,000 ac-ft
Lake Sidney Lanier (FMPR)	53	65	64	59	1,686,000 ac-ft
ALABAMA					
Lake Martin (P)	79	91	74	89	1,373,000 ac-ft
TENNESSEE VALLEY					
Clinch Projects: Norris and Melton Hill Lakes (FPR)	57	59	52	52	1,156,000 cfsd
Douglas Lake (FPR)	37	47	39	43	703,100 cfsd
Hiwassee Projects: Chatuge, Nottely, Hiwassee, Apalachia, Blue Ridge, Ocoee 3, and Parksville Lakes (FPR)	57	68	56	64	510,300 cfsd
Holston Projects: South Holston, Watauga, Boone, Fort Patrick Henry, and Cherokee Lakes (FPR)	57	66	50	55	1,452,000 cfsd
Little Tennessee Projects: Nantahala, Thorpe, Fontana, and Chilhowee Lakes (FPR)	60	70	52	63	745,200 cfsd
WESTERN GREAT LAKES REGION					
WISCONSIN					
Chippewa and Flambeau (PR)	41	31	32	25	15,900 mcf
Wisconsin River (21 reservoirs) (PR)	21	37	11	24	17,400 mcf
MINNESOTA					
Mississippi River headwater system (FMR)	18	19	17	19	1,640,000 ac-ft
MIDCONTINENT REGION					
NORTH DAKOTA					
Lake Sakakawea (Garrison) (FIPR)	78	79	73	......	22,700,000 ac-ft
SOUTH DAKOTA					
Angostura (I)	96	99	93	81	127,600 ac-ft
Bell Fourche (I)	72	88	84	62	185,200 ac-ft
Lake Francis Case (FIP)	72	86	90	82	4,834,000 ac-ft
Lake Oahe (FIP)	85	89	88	......	22,530,000 ac-ft

Reservoir Principal uses: F–Flood control I–Irrigation M–Municipal P–Power R–Recreation W–Industrial	End of Feb. 1979	End of Mar. 1979	End of Mar. 1978	Average for end of Mar.	Normal maximum
	Percent of normal maximum				
MIDCONTINENT REGION—Continued					
SOUTH DAKOTA--Continued					
Lake Sharpe (FIP)	103	102	102	99	1,725,000 ac-ft
Lewis and Clarke Lake (FIP)	72	75	78	85	477,000 ac-ft
NEBRASKA					
Lake McConaughy (IP)	66	70	74	76	1,948,000 ac-ft
OKLAHOMA					
Eufaula (FPR)	79	92	99	85	2,378,000 ac-ft
Keystone (FPR)	81	119	95	103	661,000 ac-ft
Tenkiller Ferry (FPR)	90	105	120	91	628,200 ac-ft
Lake Altus (FIMR)	43	59	79	54	134,600 ac-ft
Lake O'The Cherokees (FPR)	90	89	114	87	1,492,000 ac-ft
OKLAHOMA--TEXAS					
Lake Texoma (FMPRW)	81	92	82	88	2,722,000 ac-ft
TEXAS					
Bridgeport (IMW)	34	38	63	45	386,400 ac-ft
Canyon (FMR)	102	100	95	72	385,600 ac-ft
International Amistad (FIMPW)	111	106	91	79	3,497,000 ac-ft
International Falcon (FIMPW)	100	100	84	72	2,668,000 ac-ft
Livingston (IMW)	103	100	100	80	1,788,000 ac-ft
Possum Kingdom (IMPRW)	92	94	81	96	569,400 ac-ft
Red Bluff (PI)	35	35	7	30	307,000 ac-ft
Toledo Bend (P)	100	96	92	84	4,472,000 ac-ft
Twin Buttes (FIM)	65	67	81	28	177,800 ac-ft
Lake Kemp (IMW)	58	56	61	87	268,000 ac-ft
Lake Meredith (FMW)	33	32	35	37	821,300 ac-ft
Lake Travis (FIMPRW)	85	93	77	80	1,144,000 ac-ft
THE WEST					
WASHINGTON					
Ross (PR)	25	29	31	28	1,052,000 ac-ft
Franklin D. Roosevelt Lake (IP)	59	43	37	50	5,022,000 ac-ft
Lake Chelan (PR)	30	21	22	31	676,100 ac-ft
Lake Cushman	66	83	79	84	359,500 ac-ft
Lake Merwin (P)	91	97	105	97	245,600 ac-ft
IDAHO					
Boise River (4 reservoirs) (FIP)	72	79	56	65	1,235,000 ac-ft
Coeur d'Alene Lake (P)	30	72	103	72	238,500 ac-ft
Pend Oreille Lake (FP)	35	37	39	52	1,561,000 ac-ft
IDAHO--WYOMING					
Upper Snake River (8 reservoirs) (MP)	76	77	56	73	4,401,000 ac-ft
WYOMING					
Boysen (FIP)	70	71	68	63	802,000 ac-ft
Buffalo Bill (IP)	54	51	46	60	421,300 ac-ft
Keyhole (F)	79	80	57	44	199,900 ac-ft
Pathfinder, Seminoe, Alcova, Kortes, Glendo, and Guernsey Reservoirs (I)	53	56	45	48	3,056,000 ac-ft
COLORADO					
John Martin (FIR)	3	4	2	19	364,400 ac-ft
Taylor Park (IR)	59	52	28	56	106,200 ac-ft
Colorado–Big Thompson project (I)	41	41	22	55	722,600 ac-ft
COLORADO RIVER STORAGE PROJECT					
Lake Powell; Flaming Gorge, Fontenelle, Navajo, and Blue Mesa Reservoirs (IFPR)	62	64	57	.....	31,620,000 ac-ft
UTAH--IDAHO					
Bear Lake (IPR)	72	73	56	58	1,421,000 ac-ft
CALIFORNIA					
Folsom (FIP)	76	80	67	60	1,000,000 ac-ft
Hetch Hetchy (MP)	40	36	18	26	360,400 ac-ft
Isabella (FIR)	44	48	43	24	570,000 ac-ft
Pine Flat (FI)	77	83	54	53	1,001,000 ac-ft
Clair Engle Lake (Lewiston) (P)	64	70	51	83	2,438,000 ac-ft
Lake Almanor (P)	66	67	72	51	1,036,000 ac-ft
Lake Berryessa (FIMW)	73	78	82	88	1,600,000 ac-ft
Millerton Lake (FI)	87	94	86	63	503,200 ac-ft
Shasta Lake (FIPR)	82	94	90	83	4,377,000 ac-ft
CALIFORNIA--NEVADA					
Lake Tahoe (IPR)	16	19	14	55	744,600 ac-ft
NEVADA					
Rye Patch (I)	30	43	29	70	194,300 ac-ft
ARIZONA--NEVADA					
Lake Mead and Lake Mohave (FIMP)	89	88	82	64	27,970,000 ac-ft
ARIZONA					
San Carlos (IP)	90	96	25	19	1,073,000 ac-ft
Salt and Verde River system (IMPR)	92	97	91	48	2,073,000 ac-ft
NEW MEXICO					
Conchas (FIR)	26	26	30	77	352,600 ac-ft
Elephant Butte and Caballo (FIPR)	13	13	10	28	2,539,000 ac-ft

[a]Thousands of kilowatt-hours (the potential electric power that could be generated by the volume of water in storage).
[b]Reservoir drawn down for repairs.

HYDROGRAPHS OF SOME LARGE RIVERS, SEPTEMBER 1976 TO MARCH 1979

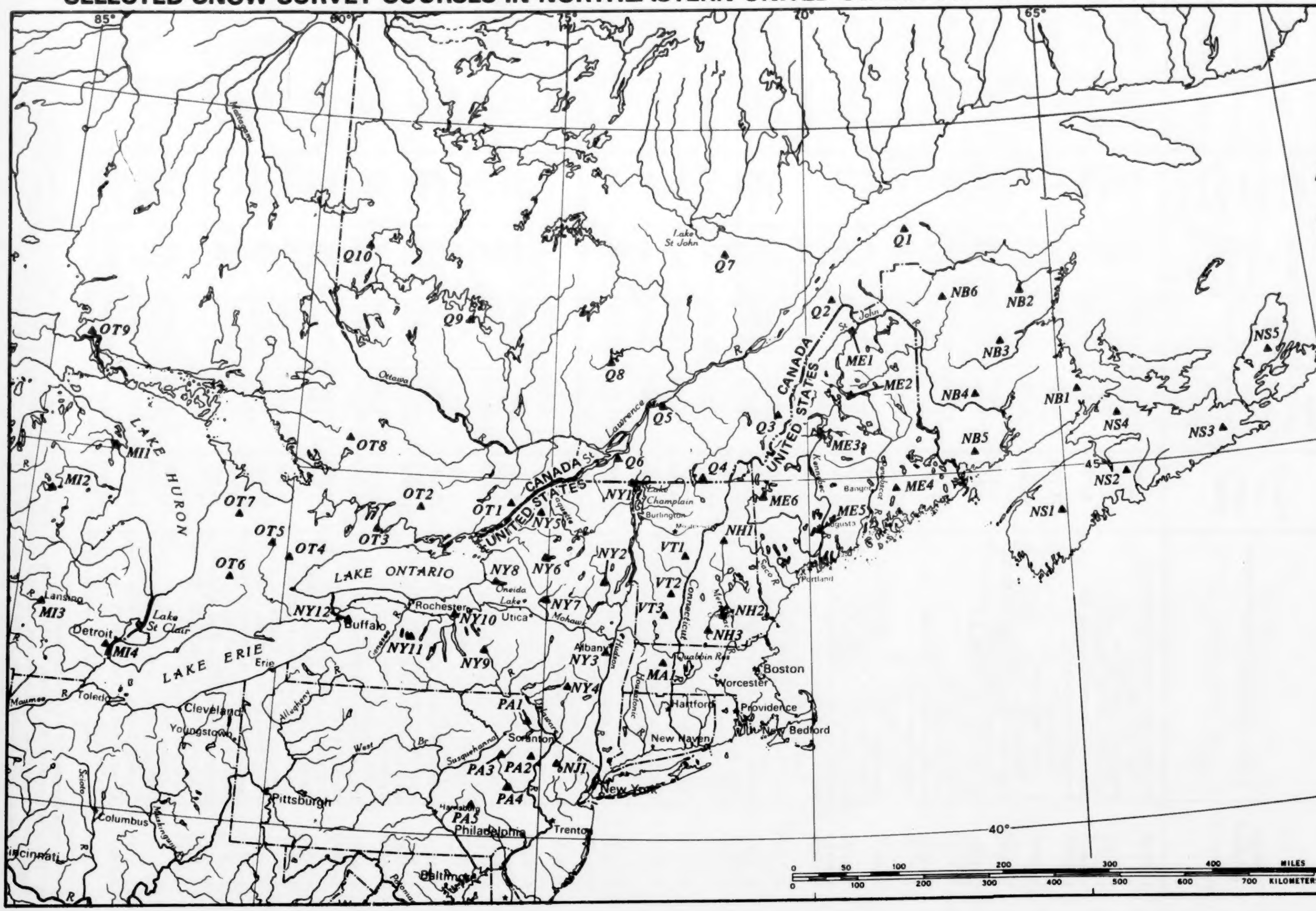


FLOW OF LARGE RIVERS DURING MARCH 1979

Station number*	Stream and place of determination	Drainage area (square miles)	Mean annual discharge through September 1975 (cfs)	March 1979					
				Monthly discharge (cfs)	Percent of median monthly discharge, 1941–70	Change in discharge from previous month (percent)	Discharge near end of month		
							(cfs)	(mgd)	Date
1–0140	St. John River below Fish River at Fort Kent, Maine	5,690	9,549	16,780	711	+361	39,500	25,500	31
1–3185	Hudson River at Hadley, N.Y	1,664	2,853	8,213	277	+485	10,000	6,500	31
1–3575	Mohawk River at Cohoes, N.Y	3,456	5,630	23,500	221	+471	....	....	......
1–4635	Delaware River at Trenton, N.J	6,780	11,630	29,600	151	+86	26,300	17,000	26
1–5705	Susquehanna River at Harrisburg, Pa	24,100	34,200	120,000	165	+250	74,100	47,900	26
1–6465	Potomac River near Washington, D.C	11,560	[1] 11,190	37,320	177	+19	16,200	10,500	31
2–1055	Cape Fear River at William O. Huske Lock near Tarheel, N.C	4,810	5,007	16,100	181	+40	9,571	6,190	31
2–1310	Pee Dee River at Peedee, S.C	8,830	9,657	39,200	277	+150	26,200	16,900	28
2–2260	Altamaha River at Doctortown, Ga	13,600	13,780	47,940	187	+124	15,700	10,100	31
2–3205	Suwannee River at Branford, Fla	7,880	6,970	12,300	124	+72	8,540	5,520	29
2–3580	Apalachicola River at Chattahoochee, Fla	17,200	22,330	45,900	118	+24	25,300	16,400	30
2–4670	Tombigbee River at Demopolis lock and dam near Coatopa, Ala	15,400	22,570	76,110	157	+96	41,500	26,800	28
2–4895	Pearl River near Bogalusa, La	6,630	9,263	39,150	224	-2	13,800	8,920	31
3–0495	Allegheny River at Natrona, Pa	11,410	[1] 19,210	49,368	136	+174	45,800	29,600	26
3–0850	Monongahela River at Braddock, Pa	7,337	[1] 12,360	32,287	152	-8	16,300	10,500	26
3–1930	Kanawha River at Kanawha Falls, W.Va	8,367	12,530	38,300	172	+94	47,700	30,800	25
3–2345	Scioto River at Higby, Ohio	5,131	4,513	15,840	177	+95	3,860	2,490	26
3–2945	Ohio River at Louisville, Ky[2]	91,170	114,100	306,500	139	+61	150,000	96,900	26
3–3775	Wabash River at Mount Carmel, Ill	28,635	27,030	108,100	214	+272	65,000	42,000	31
3–4690	French Broad River below Douglas Dam, Tenn	4,543	[1] 6,794	17,560	162	+71	....	....	......
4–0845	Fox River at Rapide Croche Dam, near Wrightstown, Wis[2]	6,150	4,185	6,853	160	+61	....	....	......
02MC002 (4–2643.31)	St. Lawrence River at Cornwall, Ontario–near Massena, N.Y[3]	299,000	241,100	269,800	116	+9	274,000	177,000	31
050115	St. Maurice River at Grand Mere, Quebec	16,300	25,300	11,400	92	+141	35,600	23,000	30
5–0825	Red River of the North at Grand Forks, N. Dak	30,100	2,524	989	62	+51	1,450	940	31
5–1335	Rainy River at Manitou Rapids, Minn	19,400	12,950	9,500	104	+30	10,000	6,500	23
5–3300	Minnesota River near Jordan, Minn	16,200	3,412	4,411	157	+869	6,670	4,310	24
5–3310	Mississippi River at St. Paul, Minn	36,800	[1] 10,580	10,580	140	+124	13,400	8,660	24
5–3655	Chippewa River at Chippewa Falls, Wis	5,600	5,110	6,865	160	+151	9,580	6,190	26
5–4070	Wisconsin River at Muscoda, Wis	10,300	8,613	13,830	153	+92	46,000	30,000	31
5–4465	Rock River near Joslin, Ill	9,551	5,852	17,100	177	+376	26,500	17,100	31
5–4745	Mississippi River at Keokuk, Iowa	119,000	62,570	133,200	158	+292	229,000	148,000	31
6–2145	Yellowstone River at Billings, Mont	11,796	6,986	3,120	105	+28	4,000	2,600	31
6–9345	Missouri River at Hermann, Mo	524,200	79,750	190,900	260	+187	255,000	165,000	26
7–2890	Mississippi River at Vicksburg, Miss[4]	1,140,500	573,600	1,373,000	169	+98	1,500,000	969,000	31
7–3310	Washita River near Durwood, Okla	7,202	1,414	753	112	+176	300	190	31
8–2765	Rio Grande below Taos Junction Bridge, near Taos, N. Mex	9,730	724	856	153	+118	800	520	31
9–3150	Green River at Green River, Utah	40,600	6,366	4,516	116	+243	7,000	4,500	31
11–4255	Sacramento River at Verona, Calif	21,257	19,150	24,870	81	-11	17,100	11,100	28
13–2690	Snake River at Weiser, Idaho	69,200	18,170	23,930	137	+19	27,500	17,800	28
13–3170	Salmon River at White Bird, Idaho	13,550	11,290	5,373	106	+25	5,720	3,700	27
13–3425	Clearwater River at Spalding, Idaho	9,570	15,570	15,340	123	+136	14,900	9,630	28
14–1057	Columbia River at The Dalles, Oreg[5]	237,000	194,600	132,000	113	+38	....	....	......
14–1910	Willamette River at Salem, Oreg	7,280	23,810	37,300	115	-31	13,100	8,470	27–31
15–5155	Tanana River at Nenana, Alaska	25,600	23,850	6,923	117	+18	7,000	4,500	31
8MF005	Fraser River at Hope, British Columbia	83,800	96,400	34,100	122	+23	38,200	24,700	29

[1] Adjusted.
[2] Records furnished by Corps of Engineers.
[3] Records furnished by Buffalo District, Corps of Engineers, through International St. Lawrence River Board of Control. Discharges shown are considered to be the same as discharge at Ogdensburg, N.Y. when adjusted for storage in Lake St. Lawrence.
[4] Records of daily discharge computed jointly by Corps of Engineers and Geological Survey.
[5] Discharge determined from information furnished by Bureau of Reclamation, Corps of Engineers, and Geological Survey.
*The U.S. station numbers as listed in this table are in a shortened form previously in use, and used here for simplicity of tabular and map presentation. The full, correct number contains 8 digits and no punctuation marks. For example, the correct form for station number 1–3185 is 01318500.

SELECTED SNOW SURVEY COURSES IN NORTHEASTERN UNITED STATES AND SOUTHEASTERN CANADA



Provisional data; subject to revision

SNOW SURVEY DATA

Map number	Snow course	River basin	Location			This season			Past seasons		Agency providing data*
									Water content		
			Elev. above MSL	Latitude	Longitude	Date of survey	Snow depth (inches)	Water content (inches)	End of March average	Years of record	
NS1	Caledonia	Medway	300	44°25′	65°03′	3/30	0	0			WSC
NS2	Mount Uniacke		500	44°53′	63°50′	3/30	0	0			...do.........
NS3	Copper Lake	South	320	45°23′	61°57′	3/30	0	0			...do.........
NS4	Oxford	Philip	120	45°43′	63°51′	......	....	....			...do.........
NS5	Margaree Valley	Northeast Margaree	150	46°21′	60°58′	3/30	0	0			...do.........
NB1	Moncton	Petitcodiac	150	46°04′	64°36′	3/30	0	0	7.6	13	...do.........
NB2	Pabineau Falls	Nipisiguit	100	47°30′	65°41′	3/13	27.5	4.2	9.5	11	...do.........
NB3	Renous	Miramichi	75	46°56′	65°55′	3/16	24.7	7.3	6.4	8	...do.........
NB4	Royal Road	N. Nashwaaksis	427	46°04′	66°43′	......	....	....	5.9	10	NBDOE
NB5	Elmcroft	Magaguadavic	300	45°16′	66°49′	3/30	0	0	2.8	14	WSC
NB6	St. Quentin No. 1	Restigouche	1,200	47°30′	67°15′	......	....	....	8.7	15	NBEPC
Q1	St-Moise	Mitis	775	48°31′	67°59′	3/24	30.8	12.8	12.6	18	QMS
Q2	Pelletier	Du Loup	1,200	47°34′	69°27′	3/25	33.4	12.3	11.9	20	...do.........
Q3	St-Theophile	Chaudiere	1,450	45°56′	70°31′	3/27	6.3	2.2	6.5	19	...do.........
Q4	Stanstead	St-Francois	1,250	45°03′	72°04′	3/28	6.2	2.2	5.0	25	...do.........
Q5	Pierreville	...do........	75	46°04′	72°48′	3/26	8.8	3.5	4.1	24	...do.........
Q6	Mercier	Chateauguay	180	45°19′	73°45′	3/27	2.9	0.9	3.4	6	...do.........
Q7	Rivere Aux Ecorces	Reservoir Kenogami	1,400	48°11′	71°38′	3/27	21.7	8.0	8.8	20	...do.........
Q8	St-Michel-Des Saints	St-Maurice	1,300	46°42′	73°53′	3/25	14.0	4.7	7.0	14	...do.........
Q9	Rabide	Gatineau	1,300	47°13′	76°43′	3/27	23.7	7.8	8.4	1	...do.........
Q10	McWatters	Outaouais	960	48°13′	78°55′	3/26	27.8	8.7	7.3	25	...do.........
OT1	Brockville	Buell Creek	350	44°38′	75°43′	4/2	0	0	2.2	8	WSC
OT2	Madoc	Moira	650	44°31′	77°31′	4/2	Patches	....	0.8	20	...do.........
OT3	Squirrel Creek	Trent	625	44°11′	78°20′	4/2	Patches	....	1.3	7	...do.........
OT4	Terra Cotta	Credit	1,125	43°43′	79°57′	4/2	0	0	1.6	16	...do.........
OT5	Waldemar	Grand	1,490	43°54′	80°17′	4/2	0	0	2.0	18	...do.........
OT6	Sebringville	Thames	1,190	43°24′	81°01′	4/2	0	0	1.1	22	...do.........
OT7	Chesley	Saugeen	975	44°17′	81°02′	4/2	0	0	1.7	19	...do.........
OT8	Kiwanis	Muskoka	1,300	45°27′	78°58′	4/2	Patches	....	4.3	14	...do.........
OT9	Wishart	Root	725	46°34′	84°17′	4/4	17.5	6.5	6.4	6	...do.........
ME1	Alagash "B"	St. John	640	47°05′	69°04′	3/27	20.0	6.8			USGS
ME2	Telos	Penobscot	1,000	46°09′	69°07′	3/28	19.0	8.0			BHEC
ME3	Moosehead	Kennebec	1,040	45°35′	69°43′	3/31	8.0	3.0			KWPC
ME4	Amherst	Coastal	150	44°49′	68°22′	3/31	0	0			BHEC
ME5	Augusta	Kennebec	160	44°19′	69°45′	3/29	0	0			USGS
ME6	Middle Dam	Androscoggin	1,430	44°46′	70°55′	4/1	18.0	6.7			UWPC
NH1	Cannon Mt. (Base)	Merrimack	1,950	44°10′	71°41′	4/2	5.3	2.4			CE
NH2	Everett Dam	...do.......	460	43°05′	71°39′	4/2	Patches	....			...do.........
NH3	MacDowell Dam	...do.......	960	42°54′	71°59′	4/2	3.6	1.2			...do.........
VT1	Vershire	Connecticut	1,920	43°59′	72°22′	4/2	Patches	....			...do.........
VT2	Proctorsville Gulf	...do.......	1,060	43°22′	72°38′	4/2	9.4	2.7			...do.........
VT3	Ball Mt. Dam	...do.......	1,130	43°06′	72°48′	4/2	9.8	3.0			...do.........
MA1	Lithia Post Office	Connecticut	1,180	42°27′	72°50′	4/2	0	0			...do.........
NY1	Perry Mills	Lake Champlain	200	44°59′	73°31′	4/3	0	0	4.19	11	USGS
NY2	Sodom	Hudson	1,400	43°37′	73°59′	4/3	0	0	6.23	11	NMP-Albany
NY3	Slingerlands	Hudson	230	42°38′	73°53′	3/19	0	0	.25	10	USGS
NY4	Margaretville	Delaware	1,340	42°09′	74°38′	3/19	0	0	.51	12	...do.........
NY5	Pyrites	St. Lawrence	400	44°32′	75°11′	4/2	0	0	3.11	12	...do.........
NY6	Stillwater Reservoir	Black	1,700	43°54′	75°03′	3/19	25.9	9.80	8.42	14	BRRD
NY7	Northwood	Mohawk	1,250	43°21′	75°04′	4/2	5.4	2.78	6.98	16	NMP-Utica
NY8	Stillwater Dam	Eastern Oswego	970	43°33′	75°55′	4/2	11.3	6.64	8.22	14	NMP-Syracuse
NY9	Cortland	E. Susquehanna	1,130	42°36′	76°11′	4/3	0	0	1.15	11	NWS-Albany
NY10	Clyde (Lock 26)	Western Oswego	392	43°04′	76°50′	4/2	0	0	.33	10	DOT-Syracuse
NY11	Canadice and Hemlock Lakes	Genesee	1,800	42°43′	77°35′	3/19	2.2	0.86	.64	13	DPW-Rochester
NY12	Buffalo Airport	Lake Erie	705	42°56′	78°44′	3/20	0	0	0	8	NWS-Buffalo
NJ1	Newton	Pequest	640	41°01′	74°47′	4/3	0	0			USGS
PA1	Prompton-Jadwin Reservoir	Lackawaxen	1,600	41°36′	75°18′	4/2	0	0			CE
PA2	Paradise Valley	Brodhead Cr.	840	41°07′	75°16′	4/3	0	0			USGS
PA3	F. E. Walter Reservoir	Lehigh	1,700	41°07′	75°44′	4/2	0	0			CE
PA4	Lyon Valley	Jordan Cr.	720	40°40′	75°40′	4/3	0	0			USGS
PA5	Meyerstown	Schuylkill	660	40°24′	76°18′	4/3	0	0			...do.........
MI1	Alpena	Thunder Bay	689	45°04′	83°34′	3/26	4.0	1.5			NWS
MI2	Houghton Lake	Muskegon	1,149	44°22′	84°41′	3/26	0	0			...do.........
MI3	Lansing	Grand	841	42°47′	84°36′	3/26	0	0			...do.........
MI4	Detroit	Rouge	633	42°14′	83°20′	3/26	0	0			...do.........

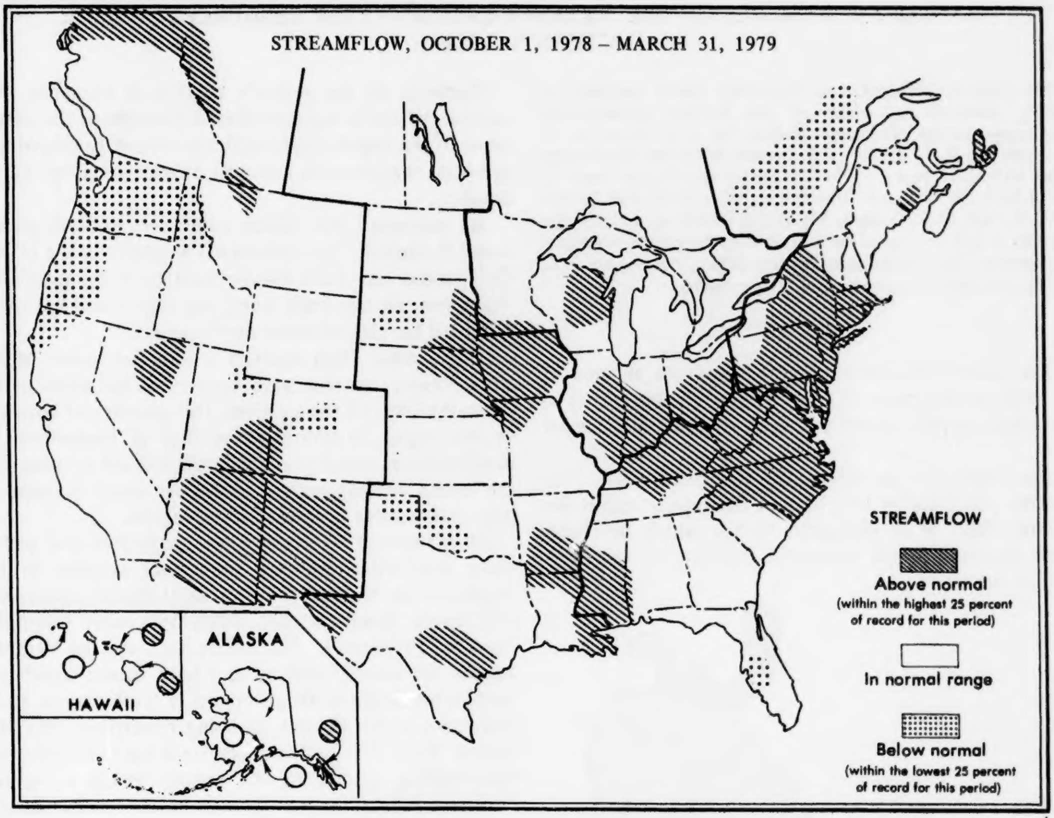
*Key: WSC – Water Survey of Canada; NBDOE – New Brunswick Department of Environment; NBEPC – New Brunswick Electric Power Commission; QMS – Quebec Meteorological Service; USGS – United States Geological Survey; BHEC – Bangor Hydro Electric Company; KWPC – Kennebec Water Power Company; UWPC – Union Water Power Company; CE – Corps of Engineers; NMP – Niagara Mohawk Power; BRRD – Black River Regulating District; NWS – National Weather Service; DOT – Department of Transportation; DPW – Department of Public Works.

DISSOLVED SOLIDS AND WATER TEMPERATURES FOR MARCH AT DOWNSTREAM SITES ON SIX LARGE RIVERS

Station number	Station name	March data of following calendar years	Stream discharge during month	Dissolved-solids concentration during month[a]		Dissolved-solids discharge during month[a]			Water temperature during month[b]		
			Mean (cfs)	Minimum (mg/L)	Maximum (mg/L)	Mean (tons per day)	Minimum (tons per day)	Maximum (tons per day)	Mean, in °C	Minimum, in °C	Maximum, in °C
	NORTHEAST										
01463500	Delaware River at	*1979	30,300	....	....	....	....	....	.....	....	.....
	Trenton, N.J.	1945–78	20,690	44	123	....	1,250	98,100	.....	0	15.0
	(Morrisville, Pa.)	(Extreme yr)		(1945)	(1978)		(1969)	(1978)			
			[c]19,660								
04264331	St. Lawrence River at	1979	270,000	167	170	122,000	113,000	126,000	1.0	0.5	2.0
	Cornwall, Ontario, near	1976–78	278,300	164	168	125,000	94,000	145,000	0.5	0	1.0
	Massena, N.Y.	(Extreme yr)		(1977)	(1978)		(1977)	(1978)			
	median streamflow at Ogdensburg, N.Y.		[c]232,500								
	SOUTHEAST										
07289000	Mississippi River at	1979	1,373,000	166	201	679,000	430,000	803,000	10.0	7.0	12.5
	Vicksburg, Miss.	1976–78	798,700	173	234	411,000	215,000	707,000	9.5	5.0	14.0
		(Extreme yr)		(1976, 1977)	(1977)		(1977)	(1978)			
			[c]813,000								
	WESTERN GREAT LAKES REGION										
03612500	Ohio River at lock and dam	1979	869,000	176	235	....	232,000	776,000	.....	4.0	9.0
	53, near Grand Chain, Ill.	1955–78	550,600	128	312	....	54,000	506,000	.....	0.5	14.5
	(25 miles west of Paducah,	(Extreme yr)		(1955, 1964)	(1968)		(1968)	(1973)			
	Ky.; streamflow station		[c]492,800								
	at Metropolis, Ill.)										
	MIDCONTINENT										
06934500	Missouri River at Hermann,	1979	193,200	227	301	135,000	91,400	199,000	5.5	2.0	10.0
	Mo. (60 miles west of St.	1976–78	97,330	186	404	72,200	29,300	173,000	7.0	0	13.0
	Louis, Mo.)	(Extreme yr)		(1978)	(1976)		(1977)	(1978)			
			[c]73,500								
	WEST										
14128910	Columbia River at	1979	166,000	103	126	50,600	34,200	73,000	5.2	3.0	7.0
	Warrendale, Oreg.	1976–78	171,500	97	117	48,200	27,200	73,300	6.5	5.0	8.0
	(streamflow station	(Extreme yr)		(1976)	(1977)		(1977)	(1976)			
	at The Dalles, Oreg.)		[c]137,400								

[a]Dissolved-solids concentrations when not analyzed directly, are calculated on basis of measurements of specific conductance.
[b]To convert °C to °F: $[(1.8 \times °C) + 32] = °F$.
[c]Median of monthly values for 30-year reference period, water years 1941–70, for comparison with data for current month.
*Dissolved-solids and water-temperature records not available.

SUPPLEMENTAL DATA FOR SIX-MONTH PERIOD ENDING MARCH 31, 1979



WATER RESOURCES REVIEW

March 1979

Based on reports from the Canadian and U.S. field offices; completed April 16, 1979

TECHNICAL STAFF	Allen Sinnott, Editor Carroll W. Saboe, Associate Editor Herman D. Brice Ruth M. Kosco John C. Kammerer Gwendolyn V. Butler Thomas H. Woodard
COPY PREPARATION	Lois C. Fleshmon Sharon L. Peterson Donna R. Johnson Stephanie F. Michie
GRAPHICS	Frances B. Davison Carolyn L. Moss Leslie J. Robinson Joan M. Rubin

EXPLANATION OF DATA

Cover map shows generalized pattern of streamflow for March based on 20 index stream-gaging stations in Canada and 130 index stations in the United States. Alaska and Hawaii inset maps show streamflow only at the index gaging stations which are located near the points shown by the arrows.

Streamflow for March 1979 is compared with flow for March in the 30-year reference period 1941–70. Streamflow is considered to be *below the normal range* if it is within the range of the low flows that have occurred 25 percent of the time (below the lower quartile) during the reference period. Flow for March is considered to be *above the normal range* if it is within the range of the high flows that have occurred 25 percent of the time (above the upper quartile).

Flow higher than the lower quartile but lower than the upper quartile is described as being *within the normal range.* In the Water Resources Review the median is obtained by ranking the 30 flows of the reference period in their order of magnitude; the highest flow is number 1, the lowest flow is number 30, and the average of the 15th and 16th highest flows is the median.

The normal is an average (but not an arithmetic average) or middle value; half of the time you would expect the March flows to be below the median and half of the time to be above the median. Shorter reference periods are used for the Alaska index stations because of the limited records available.

Statements about *ground-water levels* refer to conditions near the end of March. Water level in each key observation well is compared with average level for the end of March determined from the entire past record for that well or from a 20-year reference period, 1951–70. *Changes in ground-water levels,* unless described otherwise, are from the end of February to the end of March.

The Water Resources Review is published monthly. Special-purpose and summary issues are also published. Issues of the Review are free on application to the Water Resources Review, U.S. Geological Survey, Reston, Virginia 22092.

*Dissolved-solids and water-temperature records not available.

SUMMARY APPRAISALS OF THE NATION'S GROUND-WATER RESOURCES—LOWER MISSISSIPPI REGION

The abstract (abridged) and illustration below are from the report, *Summary appraisals of the Nation's ground-water resources—Lower Mississippi Region,* by J. E. Terry, R. L. Hosman, and C. T. Bryant: U.S. Geological Survey Professional Paper 813-N, 41 pages, 1978. This report may be purchased for $1.90 from the Branch of Distribution, U.S. Geological Survey, 1200 S. Eads St., Arlington, VA 22202 (check or money order payable to U.S. Geological Survey); or from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 (payable to Superintendent of Documents).

ABSTRACT

The Lower Mississippi Region comprises an area of 102,400 square miles (fig. 1). Almost all this area is in the physiographic province known as the Gulf Coastal Plain.

The region has an abundance of ground water. The geologic structure in that part of the region within the Coastal Plain is an elongated trough which has been filled with permeable materials, resulting in vast subsurface reservoirs.

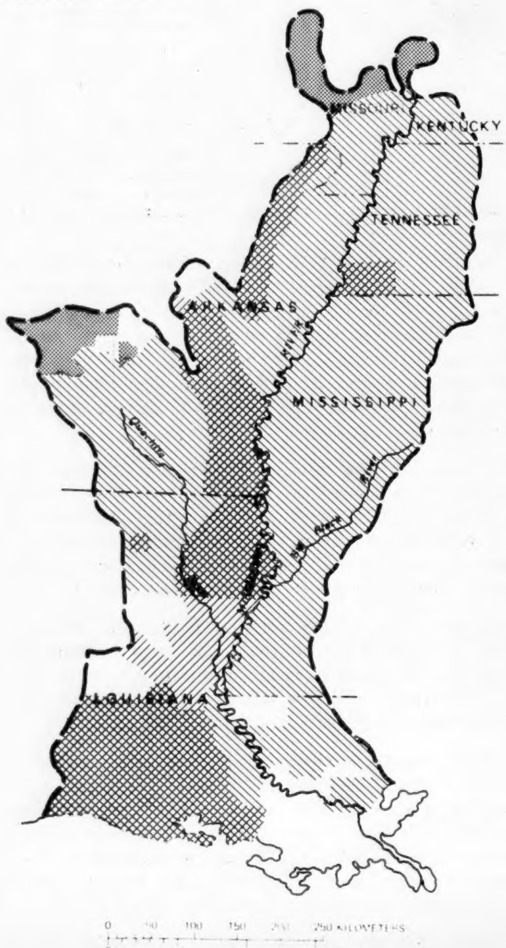
Recharge to the region's aquifers is primarily from rainfall, which is well distributed throughout the year in most of the region and is sufficient to satisfy evapotranspiration requirements and still provide recharge to the aquifers.

An estimated 844 billion cubic feet of fresh ground water is available for withdrawal annually in the region. Only about one-third of this quantity is being utilized. Therefore, on this basis alone, the region still has much potential for ground-water development.

The Coastal Plain aquifers within the Lower Mississippi Region contain large reserves of saltwater in the downdip limits of the aquifers. The quantity of saltwater in the region is several times that of freshwater. As desalinization techniques are developed and as more uses are found for saltwater, this reserve could become an important source of water for the region.

At present (1976), the most productive and potentially productive aquifers or aquifer systems in the region are the Mississippi River valley alluvial aquifer and the Sparta Sand and the Memphis aquifer (Memphis Sand in Tennessee). The Sparta Sand and the Memphis aquifer are heavily utilized and have shown significant water-level declines. However, water levels appear to be stabilizing under present pumping conditions. The Mississippi River valley alluvial aquifer is the most extensive high-yielding aquifer in the region; yields of several thousand gallons per minute may be obtained at depths of less than 200 feet.

To obtain maximum benefit from the vast quantities of ground water in the region, adequate attention must be given to the effects of proposed development upon the ground-water regime. Some changes always result from ground-water development. Predictive models have been developed that make it possible for the hydrologist to simulate aquifer responses to proposed development or other stresses. These models would be invaluable tools in progressive water-resources planning and management.



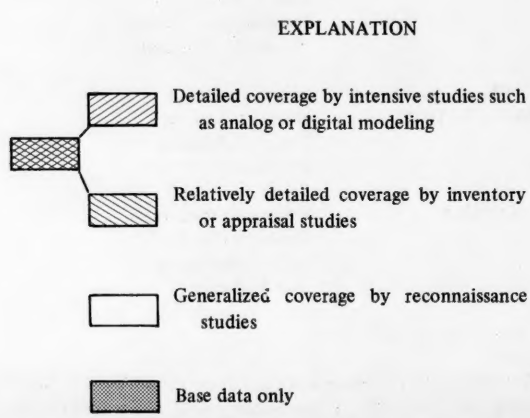


Figure 1.—Map showing delineation of areas covered in ground-water-related reports, Lower Mississippi Region.